

Mining

CONGRESS JOURNAL

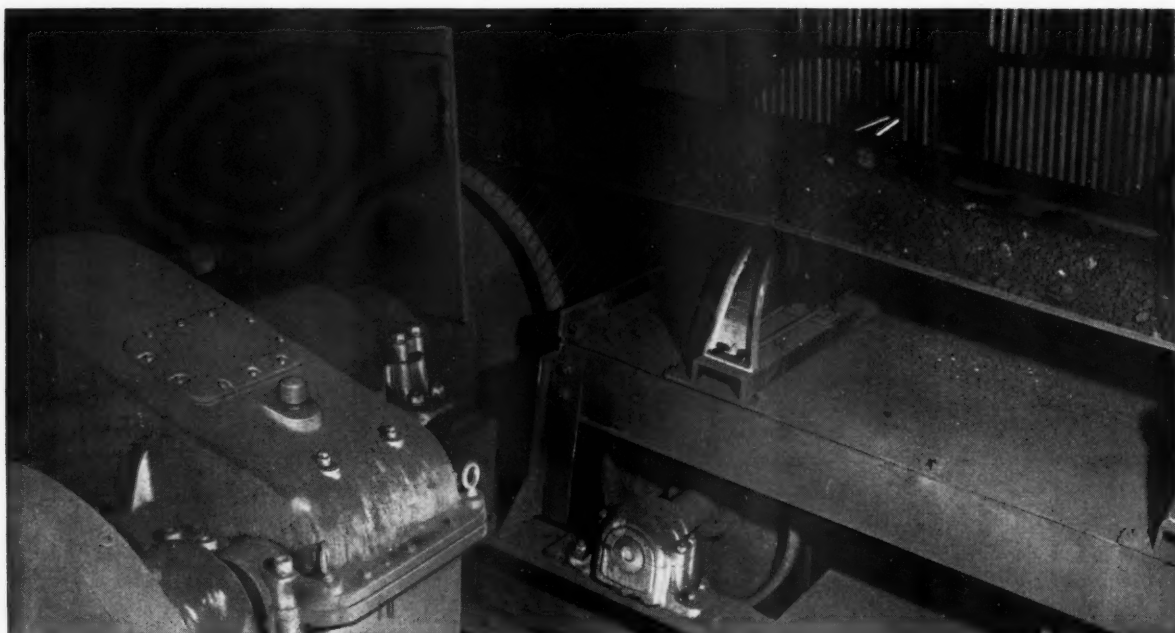


JANUARY
1954



BEAT HIGH TRANSPORTATION COSTS--

carry the load via belt conveyors



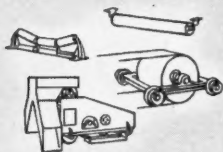
Engineered for long-life in ore handling, this Link-Belt 48-inch wide, inclined belt conveyor consists of Series 200 troughing idlers, welded steel pulleys (both plain and rubber lagged), roller bearings and an enclosed gear drive.

LINK-BELT offers you the "total engineering" so necessary for top efficiency



DESIGNED FOR OVERALL EFFICIENCY

Because of its unrivalled experience, Link-Belt can do a better job of gathering and analyzing all data. Proposals reflect this understanding of the most practical way to fit conveyors into your system requirements.



BUILT FOR LONG- LIFE PERFORMANCE

Link-Belt manufactures all components and related feeders and conveyors. You are assured of the right equipment because of this breadth of line. And Link-Belt will supply the highest grade belts engineered to the job.



DELIVERS FULL RATED CAPACITY

Link-Belt follows through on every detail of the job, including electrical controls and even wiring and foundations. What's more, Link-Belt will furnish experienced erection superintendents, staffs and skilled crews.



ASSURES SATISFACTORY PERFORMANCE

When you rely on Link-Belt as a single source for your complete system, Link-Belt accepts responsibility for placing it in full operating readiness. We will also supervise modernization of existing systems.

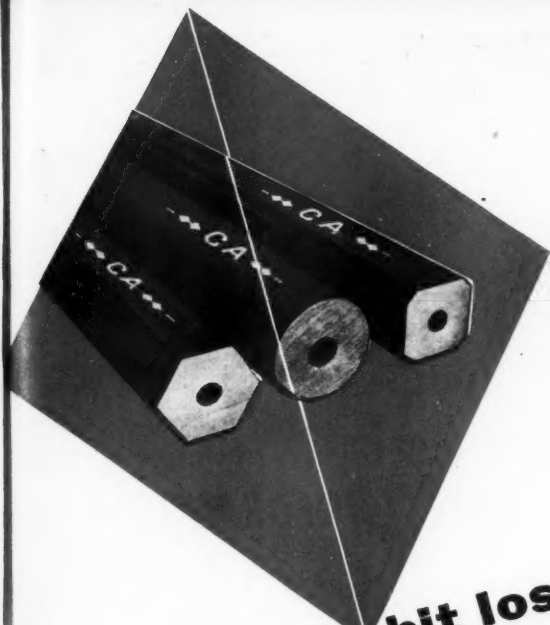
Next time you're in the market for one belt conveyor or a complete system, call a conveying expert in the Link-Belt office near you. It's his job to help you get the best in belt conveying at the lowest possible overall cost.

LINK-BELT

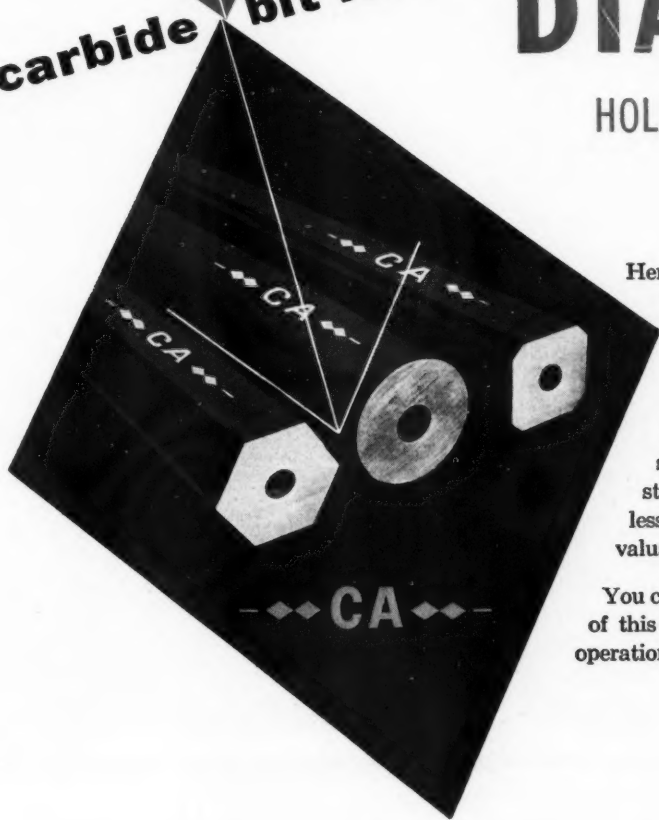
BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

19,390



cut carbide bit losses



USE CRUCIBLE

DOUBLE DIAMOND

HOLLOW DRILL RODS

Here's the finest, toughest hollow drill rod made. Crucible DOUBLE DIAMOND is made to tool steel specifications by the nation's leading producer of tool steels.

That's why it has greater fatigue strength . . . and greater fatigue strength means lower drilling costs — less down time and fewer losses of those valuable tungsten, carbide bits.

You can't afford to overlook the advantages of this fine alloy drill rod in your drilling operations. Write for full details.

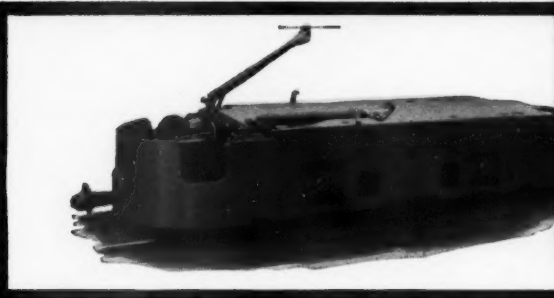
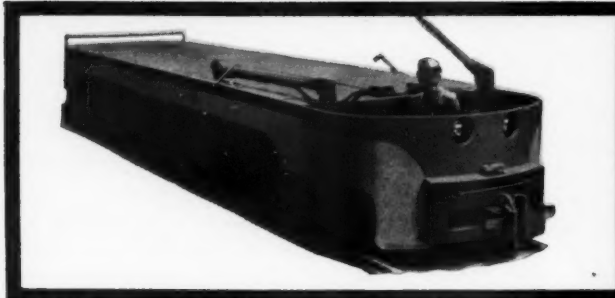
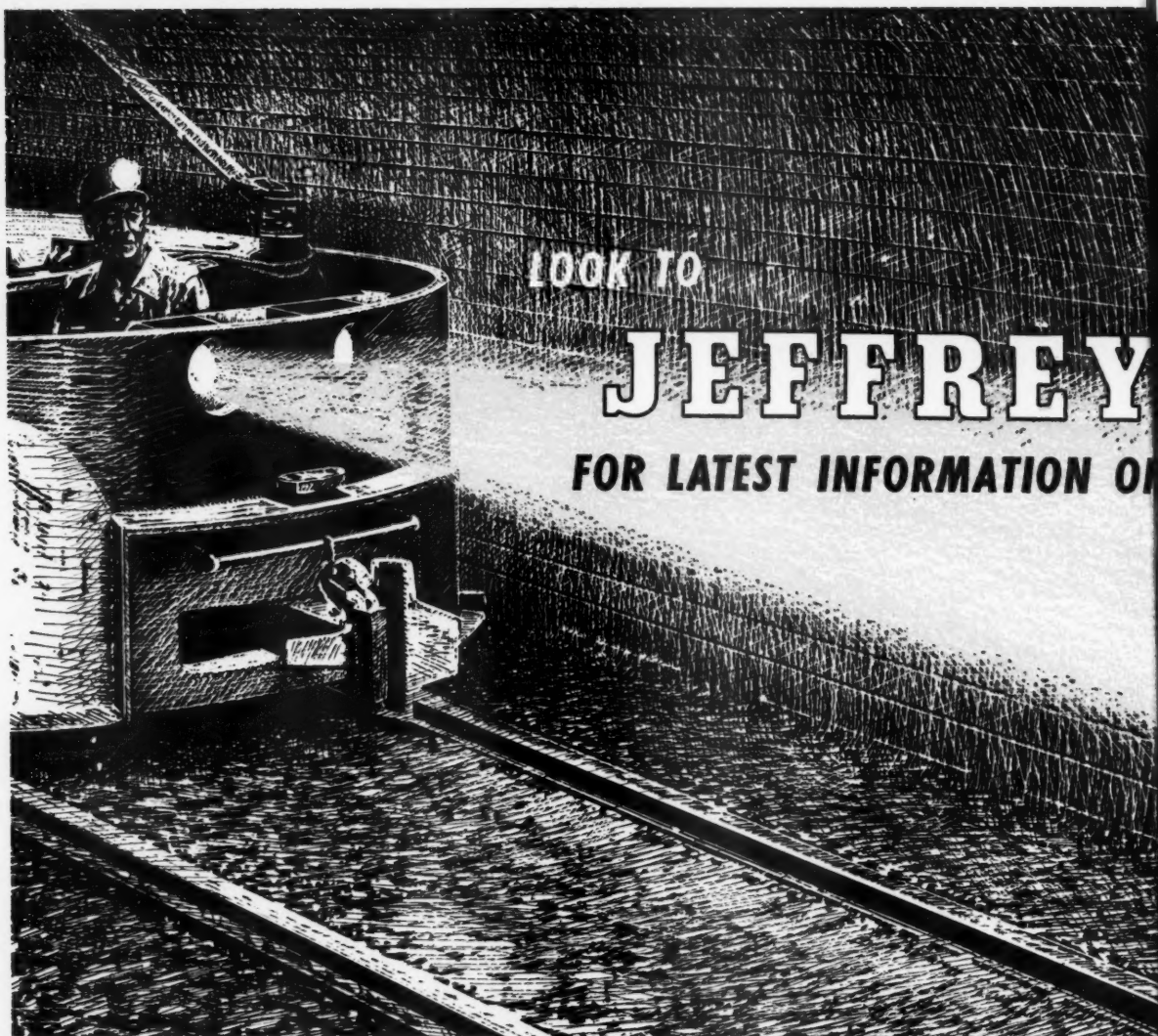
CRUCIBLE

first name in special purpose steels

54 years of *Fine* steelmaking

HOLLOW DRILL RODS

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.
SPEED • HIGH SPEED • TOOL • REZISTAL STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS



There's a definite "new look" on the pages of Catalog No. 836, as Jeffrey Mine Locomotives reflect the rounded ends and streamlined design of modern equipment.

But there's also something very "old" . . . the rugged, reliable quality that has distinguished Jeffrey Locomotives through years of heavy duty under severest conditions.

Whatever your problem of mine haulage is, you'll find the answer here. Single or tandem . . . four or eight wheel . . . trolley or storage battery . . . air, hydraulic and dynamic braking systems . . . sealed beam headlights . . . and many improved design features are shown in detail.

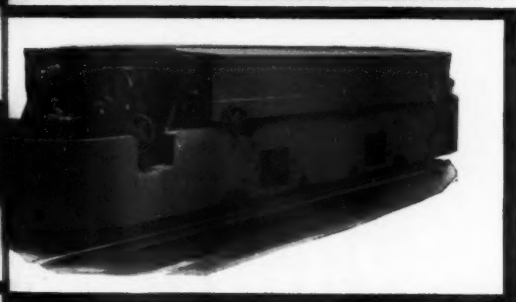
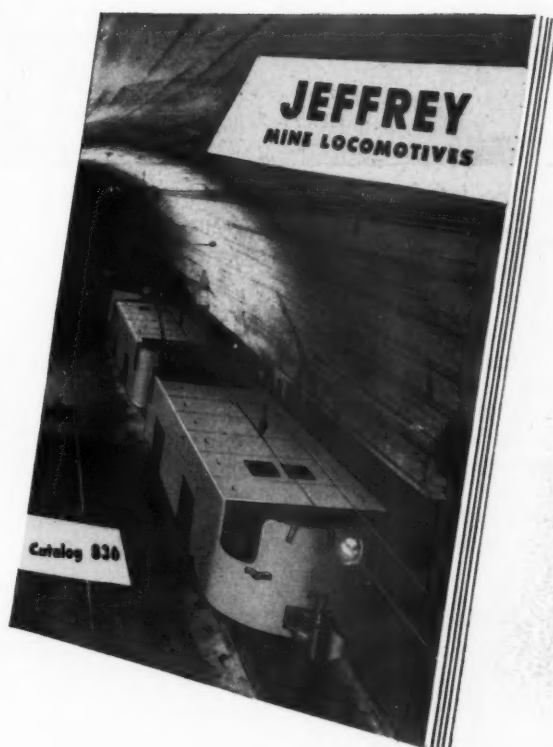
Each is backed by Jeffrey's engineering ingenuity and unequalled experience.

Y
of

MINE LOCOMOTIVES

SEND FOR THIS NEW CATALOG

Latest developments in Jeffrey Mine Locomotives are shown in the NEW Mine Locomotive Catalog just off the press. You'll find complete information on all types of standard units for main line or secondary duty.



THE JEFFREY

ESTABLISHED 1877
MANUFACTURING CO.

Columbus 16, Ohio

*sales offices and distributors
in principal cities*

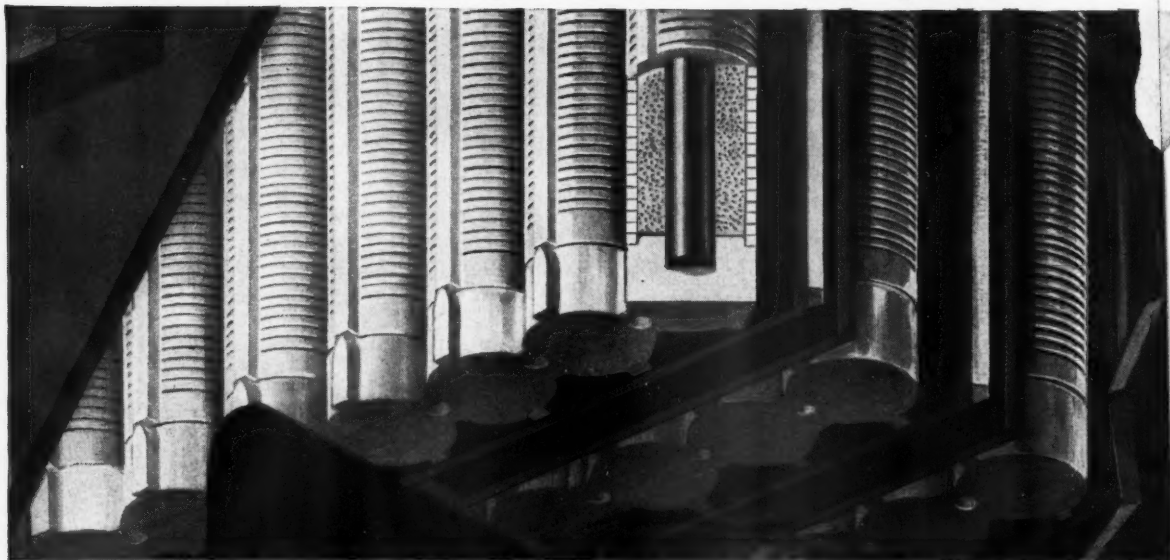
PLANTS IN CANADA, ENGLAND, SOUTH AFRICA.

**IF IT'S MINED, PROCESSED OR MOVED
...IT'S A JOB FOR JEFFREY!**

For Mine haulage . . . Exide-Ironclad now offers

★ 20% more capacity in the same space

★ Lowest cost per A.H. to own and operate



This cutaway picture shows the inside of the new T H EXIDE-IRONCLAD Battery.

Its larger positive plates, containing corrosion-resistant Silvium, are different . . . unique . . . exclusive! No other type of positive plate construction offers you the advantages of the T H Exide-Ironclad, with its slotted plastic tubes, permanently sealed on the bottom with polyethylene tube sealer. More active material is exposed to the electrolyte, resulting in greater power. More active material is retained, providing higher battery capacity for a longer working life. Other fea-

tures include improved negative plates . . . practically indestructible Pormax separators . . . new sealing compound . . . shockproof molded jar . . . unbreakable quarter-turn vent plugs of plastic . . . corrosion-resistant tray coating.

All of the features of the new T H Exide-Ironclad Battery construction provide direct operating-hour savings for you.

*Now-more than ever before...
YOUR BEST POWER BUY AT ANY PRICE!*

**The new T H
Exide-Ironclad
BATTERY**

1888...DEPENDABLE BATTERIES FOR 66 YEARS...1954

**Thrifty
Hauler**



THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 2 • Exide Batteries of Canada, Limited, Toronto
"EXIDE", "EXIDE-IRONCLAD", "SILVIUM", "PORMAX", Reg. T.M. U.S. Pat. Off.

JANUARY, 1954

VOLUME 40 • NUMBER 1

Mining

CONGRESS JOURNAL

CONTENTS

Editorial Director

JULIAN D. CONOVER

Editor

JOHN C. FOX

Assistant Editor

GEORGE W. SALL

Associate Editors

G. B. SOUTHWARD

H. L. MOFFETT

P. D. McMURRER

W. I. POWELL

Production

B. C. WILKERSON

J. J. WARD

Advertising

P. D. McMURRER

Manager

FRANK W. MORAN

Chicago

RALPH F. DUYSTERS

New York City

RALPH W. HARKER

Los Angeles and San Francisco

Circulation

M. D. TAYLOR

Published Monthly. Yearly subscriptions, United States, Canada, Central and South America, \$3.00. Foreign \$5.00. Single copies, \$0.30. February Annual Review Issue, \$1.25. Entered as Second-class Matter, January 30, 1915, at the Post Office at Washington, D. C.



Indexed regularly by Engineering Index, Inc.

FRONT COVER: Loaded mine cars are classified in underground yard at Robena Mine of the U. S. Steel Corp., Coal Division, Greensboro, Pa.

EDITORIALS	19
REVISION OF THE TAFT-HARTLEY ACT	20
By CHARLES R. KUZELL AND DENISON KITCHEL	
DEVELOPMENTS FOR INCREASED PRODUCTION AT CLIMAX ...	24
By JOHN M. PETTY	
COOLING PLANTS FOR UNDERGROUND WORKINGS—PART II..	30
By ANDRE HOUBERECHTS	
1954 COAL CONVENTION	33
AMC ANNUAL MEETING.....	35
SPECIAL ROOF BOLT APPLICATIONS.....	42
By ROBERT E. BOWIE	
HOLLOW DRILL STEELS.....	44
By W. W. DURAND	
METHODS OF PROCESSING URANIUM ORES.....	48
By S. J. SWAINSON	
PRELIMINARY REPORT ON STANDARDS FOR HEAVY RAIL	
TURNOUTS	52
OPERATORS CORNER	54
WHEELS OF GOVERNMENT	55
PERSONALS	57
NEWS AND VIEWS	59
MANUFACTURERS FORUM	69

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

Copyright 1954, by

THE AMERICAN MINING CONGRESS

RING BLDG., WASHINGTON 6, D. C.

HOWARD I. YOUNG
President

WORTHEN BRADLEY

Vice-President

ANDREW FLETCHER

Vice-President

RAYMOND E. SALVATI

Vice-President

JULIAN D. CONOVER

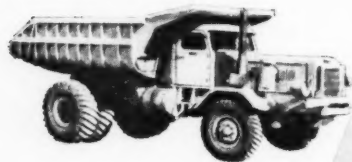
Exec. Vice-President and Secretary



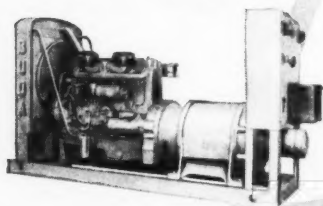
Member
Audit Bureau of Circulation

BUDA DIESELS

MONEY MAKERS **IN YOUR SHOVELS
AND DRAGLINES...**



**EQUALLY
PROFITABLE
IN ALL YOUR
OTHER EQUIPMENT**



When leading Shovel and Dragline builders pick Buda Diesels to power their equipment they choose them for good reasons:—longer life, lower operating cost—minimum maintenance . . . more power . . . greater torque . . . extensive parts & service.

These same money-making advantages of Buda Diesels can be applied to almost every other piece of construction equipment you own. Don't miss a chance to re-power with Buda Diesels . . . they're designed with your profits in mind.

BUDA

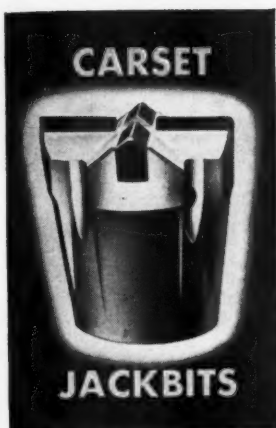
Manufacturers of Material Handling Equipment, Lifting Jacks, Maintenance of Way Products, Earth Drills and Diesel and Gasoline Engines

Facts and performance sell Buda Diesels. Get full details from your nearby Buda Distributor today. Write for Bulletin. **The Buda Company, Harvey, Illinois**

Division of Allis-Chalmers Manufacturing Co.

There's a Buda Diesel for Every Need

BC-23



A SIZE TO FIT
EVERY NEED

try them on
YOUR OWN
thread connection



SERIES 100
RODS



SERIES 116 & 119 (H & D)
RODS



TYPE 0, 1, 2 & 3
RODS

now better than ever

- BETTER CARBIDE • BETTER STEEL
- BETTER PERFORMANCE

for example

A Large Eastern Mine Now Gets

OVER 500 ft. PER BIT

with their new Carsets

... they used to be satisfied with 250!

When this Company started using Carset Jackbits, 250 feet of hole per bit was quite an impressive record.

Today, they expect over 500 feet per bit.

Better footage means a *better bit*. And this increase — *double* the earlier records — reflects the important improvements that have been made in Ingersoll-Rand Carset Jackbits. Improvements that make them the hardest, toughest, longest lasting bits obtainable.

Now you can get I-R Carset bits in 14 gauge sizes, from 1¼ to 3½ inches. And you can use them *on your own rods*.

Order a trial lot today, or ask your I-R representative to arrange for a demonstration. The results will speak for themselves.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.



957-15

ROCK DRILLS • AIR TOOLS • DIESEL AND GAS ENGINES
COMPRESSORS • CENTRIFUGAL PUMPS • VACUUM EQUIPMENT



THIS INSTALLATION is located at the Jamison Coal & Coke Co. Mine 21, Hostetter, Pennsylvania. Photograph retouched to show interior construction.

STOP BREAKAGE LOSSES with **HOLMES** LOWERING SPIRALS

- No Droppage to degrade your coal
- No wear and tear on bins
- Costs nothing to operate

Robert Holmes Lowering Spirals are designed to lower material through the use of centrifugal force, thus eliminating the need of an inside retaining lip. Each spiral is formed like a well-banked race track. The coal automatically slows down when it reaches the "safe" speed limit, regardless of the distance of travel.

As there is no retaining lip, the coal slides gently off onto the peak of the pile to form a natural angle of repose.

In this way, the coal is spread out uniformly... a real advantage where segregation is a problem.

Lowering spirals are essential to proper handling in surge bins, run-of-mine storage bins and pockets, mine retail sales bins, and consumer storage systems.

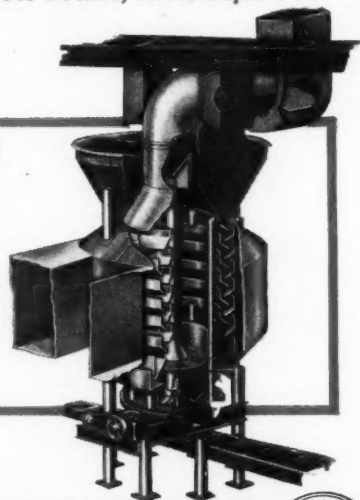
*For Free Literature and
Complete Details, Write Dept. C-7*

DRY UP TO 60 TONS PER HOUR IN ONE PASS!

Baughman VERTI-VANE THERMAL COAL DRYER

Both low in initial cost and operating cost... each Verti-Vane unit is designed for capacities from 15 to 60 tons. It handles all coal sizes from 1½" down. Reduces surface moisture to approximately 2% in a "one-pass" operation. Minimum of moving parts and slow-speed operation tend to eliminate shift breakdowns and lost time. Easily adjusted for feed conditions... requires little attention.

Write for Free Catalog No. 101 Today. Please address Dept. C-7.



**Bigger tonnages per day through
continuous one-pass coal drying.**

ROBERT HOLMES and BROS., INC.
DANVILLE ILLINOIS



Manufacturers of: SHEAVES, TIPPLE EQUIPMENT, CAGES, SKIPS, LOWERING SPIRALS, CAR PULLERS AND RETARDERS, DRYERS, LABORATORY CRUSHERS, HOISTS, VIBRATING SCREENS, DUSTOLATORS



a walker that talks

...in terms of big output

**BUCYRUS
ERIE**

THAT'S the Bucyrus-Erie 1250-B walking dragline. An exclusive walking traction mounting permits the machine to step in any direction . . . over soft and irregular ground . . . along the edge of banks . . . 7-1/3 feet at a stride. When equipped with a 235-ft. boom, it excavates 23 cubic yards at a bite. Swinging 180°, it can dump overburden almost a tenth of a mile from where it is excavated.

Yes, dependable big output, long reach, and easy, accurate moveups have made Bucyrus-Erie walking draglines favorites for stripping jobs the world over. Sizes range from 4 to 30 cubic yards.

19L53C

The Bucyrus-Erie 1250-B walking dragline is available with a 30-cu. yd. bucket on a 200 ft. boom or with a 23-cu. yd. bucket on a 235 ft. boom. Like all Bucyrus-Erie Walking Draglines, it combines large bucket capacity and digging reach with economical performance for low cost removal of overburden.

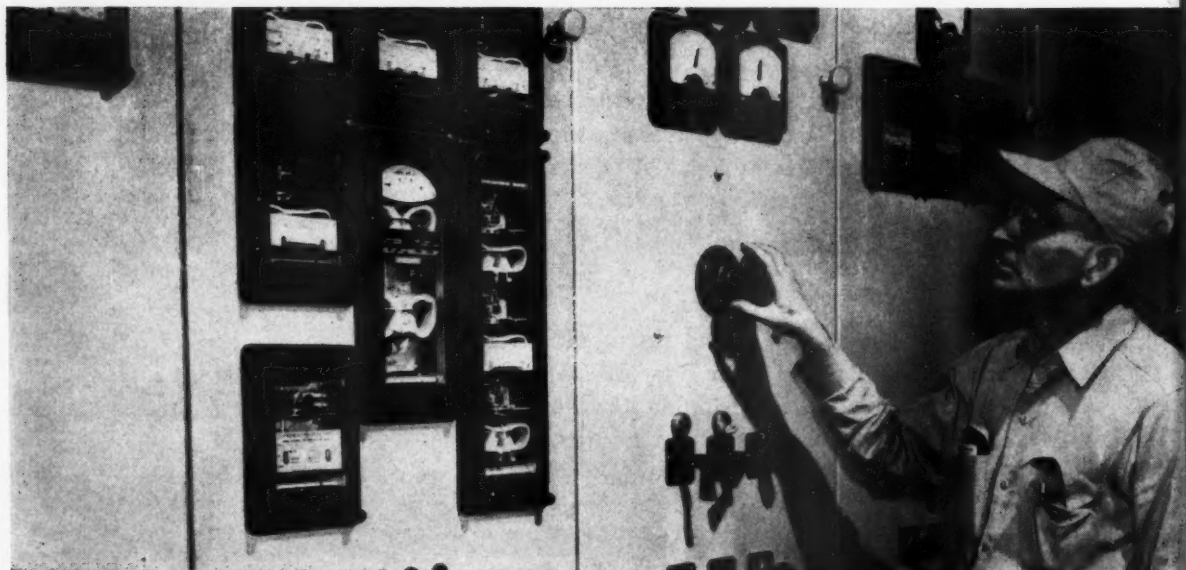
BUCYRUS-ERIE COMPANY SOUTH MILWAUKEE, WISCONSIN



ENGINEERING REPORTS:



HIGHEST-LIFT CONVEYOR hauls coal up a 16-degree slope to preparation plant at C. W. & F.'s Orient No. 3 Mine. A G-E drive moves the 42-in. wide belt 625 feet per minute, handles 1200 tons per hour.



CENTRALIZED CONTROL—middle cabinet controls conveyor motor; cabinet at right controls motor when driven as generator.



EASY-TO-MAINTAIN 1500-hp synchronous motor powers belt—may also be used as diesel-driven generator for stand-by power.

Record conveyor powered by G-E drive

WORLD'S HIGHEST-LIFT SINGLE-BELT CONVEYOR is located at the Chicago, Wilmington & Franklin Coal Company's Orient No. 3 Mine in Illinois. This Link-Belt conveyor carries coal up a 16-degree slope—lifts 868 feet in one 3290-ft continuous flight. The 42-in. wide belt operates at 625 ft per min, handles 1200 tons per hour. A General Electric drive was chosen for this conveyor because: first, the reliability of the motor and control permits regulated starting and selected speed operation. Second, the synchronous

motor has important power factor correction ability, and third, G-E system engineers helped co-ordinate the drive for easy starting, minimum maintenance, greater safety.

Another factor in the selection of a G-E drive for this unusual conveyor was G.E.'s many years of experience powering more conventional conveyors. This experience is at your service. Your nearby G-E Apparatus Sales Representative can tell you more. General Electric Company, Schenectady 5, N. Y.

Engineered Electrical Systems for Coal Mines

GENERAL  **ELECTRIC**

CARDOX

NON-EXPLOSIVE MINING METHODS

THESE 264 MINES

Are Now Using

EITHER CARDOX OR AIRDOX MINING METHODS

WEST VIRGINIA

American Coal Company.....(2)*
 Ames Mining Company.....(2)
 Anchor Coal Company.....
 Boone County Coal Company.....(2)
 Brule Smokeless Coal Company.....
 Carbon Fuel Company.....
 Clear Creek Coal Company.....
 Coalburgh-Kanawha Mining Company.....
 Crozer Coal and Coke Company.....(4)
 Eastern Gas & Fuel Associates.....(2)
 Ethel Chilton Mines.....(2)
 Gay Coal and Coke Company.....
 Gay Mining Company.....
 Gulf Mining Company.....
 Guyan Eagle Coal Company.....(2)
 Hoyman Coal Company.....(2)
 Island Creek Coal Company.....
 Imperial Smokeless Coal Company.....
 Jacob's Fork Pocahontas Coal Company.....
 Johnstown Coal & Coke Company.....
 Kimberling Collieries Company.....
 Lafayette Springs Coal Company.....
 F. M. A. Leach.....
 Lorado Coal Mining Company.....
 Maust Coal & Coke Company.....(3)
 Nassau Coal Company.....(3)
 National Mines Corporation.....
 New River Company.....
 Pardee and Curtin Lumber Company.....(2)
 Pecks Run Coal Company.....
 Peerless Coal & Coke Company.....(2)
 Peters Creek Coal Company.....
 Pond Creek Pocahontas Coal Company.....
 Premier Pocahontas Collieries.....
 Raine Lumber and Coal Company.....
 Raleigh-Wyoming Mining Company.....
 Red Jacket Coal Company.....
 Ridgeview Coal Company.....
 Royalty Smokeless Coal Company.....(2)
 Sycamore Coal Company.....
 Tioga Coal Corporation.....
 Truax-Traer Coal Company.....
 United Pocahontas Coal Company.....(3)
 United States Steel Company.....
 Warner Collieries.....
 West Gulf Collieries.....
 West Virginia Coal & Coke Corporation.....(3)
 West Virginia Coal and Coke Company.....(2)
 Weyanoke Coal and Coke Company.....
 Winding Gulf Collieries.....(2)

KENTUCKY

Bell & Zoller Coal & Mining Company.....(2)
 Big Jim Coal Company.....

Black Star Coal Corporation.....
 Blue Bird Mining Company.....
 Carrs Fork Coal Company.....
 Cinderella Coal Corporation.....(2)
 Citation Coal Company.....
 Columbus Mining Company.....
 Crech Coal Company.....
 W. G. Duncan Coal Company, Inc.....
 Eblen Coal Company.....
 Fourseam Coal Corporation.....
 Harold Fuel Company, Inc.....(2)
 Harvey Coal Company.....
 Inland Steel Company.....
 Jewell Ridge Coal Corporation.....(2)
 Kentland Elkhorn Coal Company.....
 Kirkpatrick Mining Company.....
 Knott Coal Corporation.....
 Liberty Coal Company.....
 Liberty Elkhorn Coal Company.....(3)
 Marlowe Coal Company.....
 Mary Gail Coal Company.....
 Meem-Haskins Coal Corporation.....
 Republic Steel Corporation.....
 Smith Coal Company.....
 Stephens Elkhorn Fuel Company.....
 Stoker Coal Company.....
 West Kentucky Coal Company.....(2)

TENNESSEE

Block Coal & Coke Company.....
 Straight Fork Coal Company.....
 Virginia Harlan Coal Company.....

PENNSYLVANIA

Barnes & Tucker Company.....
 The Berwind-White Coal Mining Company.....
 Butler Consolidated Coal Company.....
 Cambria Clearfield Mining Company.....
 Campbell Coal Company.....
 Ebensburg Coal Company.....
 G. & S. Coal Company.....
 Imperial Coal Corporation.....
 Johnstown Coal & Coke Company.....
 Mathies Coal Company.....
 Marco Coal Company.....
 Moffitt Coal Company.....
 Morrisdale Coal Mining Company.....
 Ontario Coal Mining Company.....
 Pittsburgh Coal Company.....
 Republic Steel Company.....
 J. L. Sager Coal Company.....
 Springfield Coal Corporation.....
 Weirton Coal Company.....
 Westmoreland Coal Company.....

ANNUAL

Roll Call

OHIO

Columbia Southern Chemical Corporation
Dindo Coal Company, Inc.
The Farm Bureau Cooperative Association Inc.
Gem Coal Company
Hanna Coal Company of Ohio
Jefferson Coal Company
Lorain Coal & Dock Company
Powhatan Mining Company
Warner Collieries Company

ILLINOIS

Bell & Zoller Coal & Mining Company
Belle Valley Coal Company
Blue Bird Coal Company
Carmac Coal Company
Chicago, Wilmington & Franklin Coal Company
Deer Creek Coal Company
Eddy Coal Company
Freeman Coal Mining Corporation
Joliana Mining Company
Mid-Continent Coal Corporation
Mofiat Coal Company
Old Ben Coal Corporation
Peabody Coal Company
Pine Bluff Coal Company
Pachirrer & Sons Coal Company
Sahara Coal Company
Truax-Traser Coal Company
Union Colliery Company
Wenneborg Coal Company
Wilkins Coal Company

INDIANA

Enoco Collieries Company
Ingle Coal Corporation
Linton Summitt Coal Company
Pandora Coal Corporation
Princeton Mining Company
Snow Hill Coal Corporation
Truax-Traser Coal Company
Viking Coal Corporation

OKLAHOMA

Reliance Smokeless Coal Company

COLORADO

Arrowhead Coal Company
Bear Coal Company
Black Diamond Fuel Company
Boulder Valley Coal Company
Canon Black Diamond Coal Company
Canon Monarch Coal Company
Canon National Coal Company
Chandler Coal Company
Clark Coal Company
Clayton Coal Company
Colorado Fuel & Iron Corporation
Colowyo Coal Company
Consolidated Coal & Coke Company
W. D. Corley, Jr.

Domestic Coal Company
Dry Creek Coal Company
Dunn Coal Company
Graden Coal Company
Griffith Coal Mining Company
Imperial Coal Company
Jenkins & Mathis Coal Company
Johnson Coal Company
Juanita Coal & Coke Company
Louisville Lafayette Coal Company
Minerals Development
McNeill Coal Corporation
McNeill Coal Corporation
William E. Russell Coal Company
Taylor Coal Company
Tomahawk Coal Company

MONTANA

Bair-Collins Coal Company
Brophy Coal Company
Johnson Coal Company
Nies Brothers
Northern Coal Company
Racci Brothers
Western Coal Company

WYOMING

Brunell Coal Company
Colony Coal Company
Gunn & Quealy Coal Company
Ronocco Coal Company
Storm King Coal Company

UTAH

American Gilsonite Company
Hi-Heat Coal Company
Kaiser Steel Company
Peerless Sales Company
Spring Canyon Coal Company

NEW MEXICO

St. Louis, Rocky Mountain & Pacific Company

ARKANSAS

Smokeless Coal Company

CANADA

Century Coal Ltd.
Lethbridge Collieries, Ltd.
The Monarch Coal Mining Company, Limited
Red Deer Valley Coal Company, Limited
West Canadian Collieries, Limited

VIRGINIA

Blackwood Fuel Company, Inc.
Buchanan County Coal Corporation
Coal Processing Corporation
Margaret Ann Coal Corporation
Page Pocahontas Coal Corporation
Sycamore Coal Corporation
Wallen Coal Company

CARDOX HARDSOCC

DRILLING EQUIPMENT

Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

Help for Mine Operators on the cost sheet... and on the job

In the past 15 to 20 years, the mining industry has kept stripping and output costs down in spite of rising labor and material costs. To do it, mine operators have pioneered new earth-moving techniques that have put constantly increasing demands on machinery. That's why in today's tough competitive era, mining requires modern, versatile equipment that enables the mine operator to increase output per man-hour and work at a profit.

In an effort to cooperate fully to meet these demands, Allis-Chalmers has for years geared its progress to that of the mine operator himself... now offers him completely new designs like the HD-15... a machine that takes advantage of even the most recent developments in tractor application.

The design of the HD-15 also makes full use of new metals, new oils and greases, and the latest manufacturing processes. Existing models were not allowed to restrict Allis-Chalmers engineers... so they worked right from the ground up, matching part to part, assembly to assembly, and the entire tractor to its Allied equipment. As a result, the HD-15 offers new standards in ease of operation and service, as well as long-life performance. With outstanding balance characteristics, it handles both mounted and drawn equipment well, provides maximum flexibility for the wide variety of jobs.

We invite you to talk with your nearby Allis-Chalmers dealer to compare values... see for yourself how the HD-15 can be a big factor in helping you to increase output per man and hold costs in line.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

HD-15

109 drawbar hp.

27,850 lb.

Six speeds forward to 5.8 mph.

Three reverse speeds to 4.5 mph.

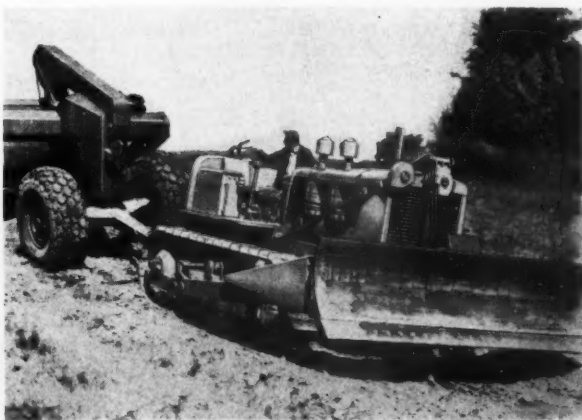


Constant progress in earth-moving methods has been matched by such design advances as this HD-15 and

its engine-mounted dozer . . . which were engineered and tested as a unit, right from the start.



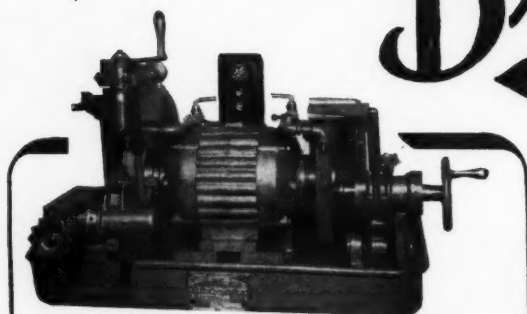
This HD-15 Tractor Shovel is a tool which introduced a new era of tractor usefulness. This versatile machine moves from job to job easily and does traditional jobs in a better, faster way.



The improvements and refinements of really modern design take on new significance as demands on machinery grow. Extra yardage handled . . . or lubrication time saved means working more efficiently, more profitably.

"Blount"

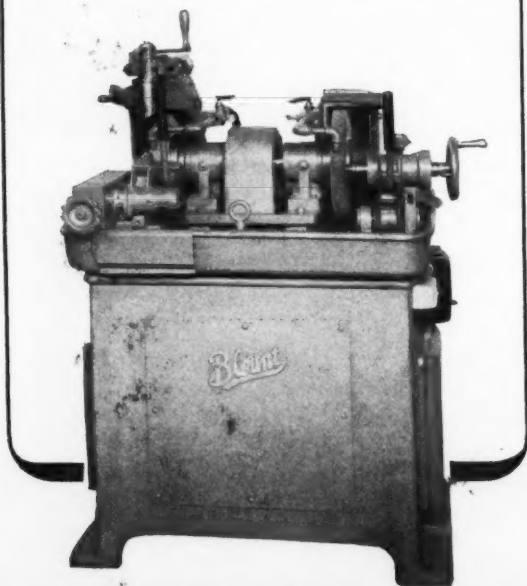
DETACHABLE BIT GRINDERS



Bench Type Grinder
(Pan dimensions—35" x 26" x 4½")

BENCH and FLOOR TYPES
Electric, Air or Gasoline Driven

Floor Type Grinder
(Over-all height—55", floor space—36" x 31")



Let Blount Grinders solve your bit grinding problems. Whatever type of detachable bits you're using, Blount can furnish just the right equipment to keep your bits in shape—for improved drilling performance and longer life.

Full information on request—no obligation. All you have to do is to advise the type and make of bits to be sharpened, and the type of drive desired.

- Grinders furnished with 2 HP 12" or 3 HP 14" diameter wheels, 1¼" arbor.
- Equipped with Timken tapered roller bearings.
- Furnished complete with fluting, gauging and form wheel, dresser fixtures of improved design (wear and water resistant).
- Equipped with 1¼" wide regular form and gauging wheels for grinding regular steel bits.
- Special type wheels furnished for grinding carbide tipped bits.
- Coolant tank and circulating pump furnished with floor type grinders.
- Starting switch with motor protection.

J. G. BLOUNT COMPANY

EVERETT 49, MASSACHUSETTS, U.S.A.

HOW TO SPOT DAMAGE FROM MECHANICAL ABUSE

THESE:



RUNOVERS

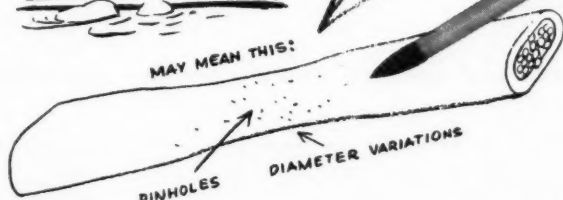


RIB PINCHING

SLIVER CUTS



MAY MEAN THIS:



PINHOLES

DIAMETER VARIATIONS

MINING MACHINE CABLE

... AND WHY THERE'S MUCH MORE TOUGHNESS IN ANACONDA'S NEW MINING MACHINE CABLE

Your naked eye can't spot diameter differences in new cables. That's why it's important to check promptly when you do see variations in cable after it's been used. It has probably been crushed... by runovers or rib-pinching. Compression cuts may let in moisture to shorten cable life.

HOW TOUGH SHOULD CABLE BE?

As tough as we can make it—regardless of cost. One break in a cheap cable costs more than you can save by buying on price. The new ANACONDA Cables mean lower costs to you because they can take

much more abuse. In fifteen mines recently surveyed, the average life of ANACONDA Cables on shuttle cars jumped 300% over cables used only a few years ago.

WHY THE NEW ANACONDA CABLES LAST LONGER

A stronger jacket, made from a new neoprene compound, resists heat, flame and moisture better. In wet mines, sliver-cuts that may cause shocks are less likely to occur. A new cold-rubber insulation means new toughness. Moisture-wise and puncture-wise both. A new type of stranding improves the flexibil-

ity of these cables under stress.

YOU BE THE JUDGE

Examine an ANACONDA Cable. See why these things are so. Call your nearest Anaconda Sales Office or Distributor for a sample. And remember: no ANACONDA Cable has ever failed a U. S. Bureau of Mines flame-test. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

53901

ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE

FEAT. TWIN CABLES FOR:
shuttle cars
continuous miners
loaders cutters
drill trucks



HI-VOLT CABLES FOR:
mine power



TYPE SH-D FOR:
shovels



TYPE SO FOR:
hand drills
remote control



TROLLEY WIRE



FEEDER CABLES



TELEPHONE WIRE



SHOT FIRE CORD



WELDING CABLES

BOWDIL PRODUCTS

HELP YOU GET MORE \$\$\$ FROM THAT MINE OF YOURS

**PATENTED
CONCAVE
SHAPE STAYS
SHARPER LONGER**



Patent No. 2,217,347

NEW 1-29 CONCAVE BIT!

CONCAVE SHAPE STAYS SHARP AS IT WEARS AWAY. THAT MEANS

- | | |
|---------------------------|------------------------|
| 1. EASIER CUTTING | 6. LESS DRAG |
| 2. FASTER CUTTING | 7. LESS POWER CONSUMED |
| 3. COARSER CUTTINGS | 8. LESS DOWN TIME |
| 4. MORE PROFITABLE STOKER | 9. LESS MAINTENANCE ON |
| 5. LESS BUG-DUST | MINING MACHINES |

.. and the double point doubles your savings!

BOWDIL CUTTER BAR

Bowdil Cutter Bars are designed for extra strength and power saving. Rivet-free body, Z bar construction, wide wearing strips make it the sturdiest bar in mining. Bowdil Bars are standardized to fit all coal mining machines.



FABRI-FORGE CHAIN

Lower your operating costs with Bowdil Fabri-Forged Chain. Rugged, easy to maintain, the drop-forged lug body stands up under heavy wear with breakage practically eliminated. A major improvement is the true-running radial track guide.



BOWDIL FAST ROPE SOCKET

You can save time with the Bowdil Rope Socket . . . takes just two minutes to install. No tools necessary. High tensile-strength steel and patented design give maximum strength.



REPLACEABLE POINT MINER'S PICK

With a Bowdil Miner's pick, it only takes a few seconds to replace a dull, blunted point with a sharp one. Light or heavy, Bowdil pick heads are perfectly designed for weight and balance, come with or without wood handle.



DETACHABLE JAW SPIKE PULLER

Small, easy to handle . . . pays for itself many times over. Detachable jaws make it possible to replace claws without delay. The special construction pulls spikes without bending them.

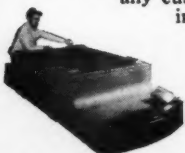


SPROCKETS FOR ALL MINING MACHINES

Bowdil Sprockets are made from special heat-treated alloy steel and designed for hard wear. Our stock of over 100 different styles includes clutch, spline and keyed types—various tooth designs of 4 to 13 teeth.

WANT SOMETHING SPECIAL? BOWDIL CAN BUILD IT

Bowdil has the staff and facilities to work with you on any custom building or rebuilding, engineering, machining, fabricating. Excellent heat-treat equipment. If you have a problem, bring it to Bowdil.



BATTERY OPERATED MINE LOCOMOTIVE
DESIGNED AND BUILT BY BOWDIL

SALES ENGINEERS IN—Whitesburg, Kentucky—West Frankfort, Illinois
Charleroi, Pennsylvania—Denver, Colorado—Big Stone Gap, Virginia
Danville, West Virginia—Canton, Ohio—Birmingham, Alabama
Helper, Utah—Kansas City, Missouri—Centerville, Iowa—Topeka, Kansas
New Castle, England—Alberta, Canada

SALES AGENTS
FOR
The Cincinnati
ELECTRIC
DRILL

BOWDIL
COAL CUTTING EQUIPMENT
CANTON OHIO

Editorials

JOHN C. FOX, Editor

JANUARY, 1954

Judge for Yourself

THE Commission on Foreign Economic Policy "is directed to examine, study and report on the subjects of international trade and its enlargement consistent with a sound domestic economy, our foreign economic policy, and the trade aspects of our national security and total foreign policy; and to recommend appropriate policies, measures and practices." So says the Trade Agreements Extension Act of 1953, Public Law 215, 83rd Congress.

A report compiled for the National Association of Electrical Manufacturers by the National Industrial Conference Board was recently made available to the commission for the information of its members. Much of the material in this report applies to the position of all U. S. industry as compared with that of other countries in international trade.

Reported here without comment, these facts and figures should be of great interest to all Americans. They do not need editorializing. Instead the reader is left to judge for himself.

In the first half of 1953, 50 per cent more electrical machinery was imported into the United States than in the previous year, while exports rose only nine per cent.

A comparison of European and U. S. price quotations in the past 18 months in Latin America, Asia and even here at home, shows that American manufacturers have been consistently underbid by foreign firms.

They can make such bids because of a number of advantages they enjoy. Wage rates range from 33 per cent to 90 per cent lower than ours. The legal workweek in most European countries is 44 to 48 hours and overtime payments are generally not more than 25 percent above regular wages.

Foreign exporters enjoy many domestic and export subsidies plus a wide variety of other types of aid from their governments. United States producers have much less assistance of this sort.

Postwar conditions have led to the establishment (or intensification) of numerous import restrictions and exchange controls by foreign countries. Many of these restraints on international trade are far more effective barriers to its expansion than are protective tariffs. The United States Government, except in a few cases where import quotas have been imposed, does not invoke any of these restrictions.

If the "dollar gap" be defined as the excess of the dollar value of U. S. exports of goods and services over our imports of goods and services, then the dollar gap has practically vanished. During the 12 months ended June 30, 1953, imports into this country exceeded the exports for which we were paid. As a consequence, we have had to settle accounts abroad by exporting gold bullion, dollar bank balances, Federal government bonds or other obligations.

Meanwhile, foreign nations received more in economic and military aid than during any previous 12-month period since World War II. Incidentally, the U. S. gold, bank balances and government securities used to settle with other nations during the first half of 1953 would have more than paid for all the economic aid extended.

Our Federal government derives about one per cent of its revenues from import duties and 71 percent from individual and corporate income taxes. Foreign governments collect on an average about 35 percent of their revenues from income taxes and the rest largely from general sales taxes, excise taxes, import duties, etc.

No industrial nation has a lower tariff structure than the United States. Since 1934 our tariff rates have been cut 71 percent. Any further reductions would be practically the equivalent of accepting international free trade—without reciprocity from the rest of the world.



Arena where fate of Taft-Hartley Act will finally be decided

Revision of the Taft-Hartley Act

Second Session of the 83rd Congress Will See Action in Field of Labor Relations. Here Is a Review and Preview of the Issues at Stake

By **CHARLES R. KUZELL** and **DENISON KITCHEL**

General Manager
Phelps Dodge Corp.

Attorney
Phoenix, Ariz.

THE policy of any national administration with respect to labor management relations and the current status of implementing federal legislation have a vital and direct effect on the mining industry as a whole and on each and every employer and employee engaged in the industry. The passage of the Taft-Hartley Act in 1947 marked the end of a 12-year period during which federal policy and federal legislation in this field were designed solely to encourage and promote the growth of labor unions. This was accomplished by granting unprecedented privilege and protection to unions while at the same time fettering management with unprecedented restrictions and penalties.

The Taft-Hartley Act was a step in the direction of establishing, by further federal legislation, some balance in the relationship between labor and management and of affording to individual employees and to the public some degree of protection against the unbridled power of labor leaders. Although it became the federal law, it

never represented the policy of the Truman Administration. Now, with a change of national administration, we still face the question of whether further steps in the direction indicated by Taft-Hartley or whether the direction will be reversed to that of the 1935-1947 era or whether a compromise direction will be followed. Strangely enough, the answer has not been supplied during the first year of the Eisenhower Administration. In the light, however, of some significant events such as the death of Senator Taft, the almost simultaneous indication of a pro-union policy by the White House, and the resignation over the Taft-Hartley issue of the administration's first Secretary of Labor, this question and its ultimate answer continue to be a grave problem.

Attempt Revision or Repeal

From the moment that the Taft-Hartley Act was passed over the veto of President Truman on June 23, 1947, union political leaders embarked on a campaign of vilification and distortion

designed to discredit the new law and its authors. They characterized the law as a "slave labor law," a "sweat shop law" and a "union busting law." In 1949 they made an all-out effort to have it repealed. In spite of a Democratic Congress and a Democratic Administration they failed in this effort. They then made repeal of Taft-Hartley a major issue in the 1950 Congressional elections, attempting to defeat all candidates with pro-Taft-Hartley records or leanings. Senator Taft himself was the "number one" target of that campaign but carried his State by one of the largest margins in its history. For the most part, the candidates opposed by the labor leaders on the issue of Taft-Hartley were elected or re-elected.

The results of the 1950 elections temporarily cooled the ardor of the labor leaders for further tests of political strength on the issue of Taft-Hartley. The sessions of the 82nd Congress in 1951 and 1952 were singularly devoid of Taft-Hartley activity. Only one minor change has been made in the Taft-Hartley Act since its enactment in 1947.

The 1952 Campaign

Although reference was made to Taft-Hartley in the platforms of both of the major political parties, the Republicans advocating revision and the Democrats advocating repeal, the issue played a minor role in the presidential campaign of 1952. It was submerged in the all-engulfing debates on foreign policy and extravagance and

corruption in government. Not once during the campaign did General Eisenhower state any specific views on Taft-Hartley revision. His overwhelming victory at the polls provided no tangible basis for gauging what the new administration's policy would be with respect to the controversial issue of Taft-Hartley.

Activity in Congress

The first session of the 83rd Congress had no sooner commenced than the legislative hopper was flooded with bills calling for revision of Taft-Hartley. They ranged in approach from those calling for outright repeal to those which would substantially strengthen the present law from the standpoint of curbing the still unbridled power of labor bosses and protecting the interests of the public and of individual wage earners. Senator Taft introduced a series of five bills among which were several which would substantially weaken Taft-Hartley. These introductions seemed to indicate that Senator Taft was initiating a move to appease the labor leaders and that in taking such action he was acting in accordance with some policy that might have been adopted by the White House. This later turned out not to be the case. The Administration had adopted no policy. Furthermore, Senator Taft stated at the outset of the Senate Labor Committee hearings that neither he nor the Ad-

ministration had any bills to propose and that he had introduced a few bills "more to start the ball rolling than to indicate that they have any official standing or that they may be finally adopted by the committee." As a matter of fact, most of the bills which Senator Taft introduced represented amendments to Taft-Hartley which had become more or less identified with him in the course of the 1949 struggle to prevent repeal of the Act. Nevertheless, the Taft bills and the absence of any word as to the White House position did create an atmosphere of appeasement as the time approached for opening hearings on Taft-Hartley revision.

The make-up of the Senate Committee on Labor and Public Welfare was in and of itself largely pro-labor and except for three or four stalwarts on the majority side the members favored emasculation of the Taft-Hartley Act.

The House Committee on Education and Labor presented a somewhat different picture, being composed of a fairly strong pro-Taft-Hartley group. It was obvious that the only real hope of at last retaining Taft-Hartley in its present form lay in the House.

The White House Attitude

Everyone concerned kept looking to the White House for some word which would indicate the Administration's program and policy. The obvious

NOTE: Copies of the statement filed by spokesmen for the mining industry on March 13, 1953, are available on request.

A detailed analysis of the 19 points in the "preliminary draft" of July 31 was prepared by the AMC Resolutions Committee, Subcommittee on Labor Relations. Copies are available on request to the American Mining Congress, Ring Building, Washington 6, D. C.

spokesman under normal circumstances would have been the Secretary of Labor. But President Eisenhower's Secretary of Labor, Martin Durkin, was the former president of a large international labor union and as such had repeatedly advocated repeal of Taft-Hartley. Unless the Administration favored unconditional repeal of the Act, obviously Durkin could not be permitted to say anything.

On February 2, in his message to Congress on the State of the Union, President Eisenhower made the following statement:

"We have now had five years' experience with the Labor Management Act of 1947, commonly known as the Taft-Hartley Act. That experience has shown the need for some correc-

Labor Relations

Statement of Policy of The American Mining Congress adopted at Seattle, Wash., September, 1953

LESS than a year ago the electorate expressed emphatically its desire to return to sound principles of government. Inherent in that expression was a rejection of political bossism in any form. Nevertheless, in the field of Federal labor legislation there has been evidence that the appeasement of labor leaders may still be a dominant factor in the formulation of national policy. The political forces which would lead the nation down the inevitable path to socialism under a labor government continue to exert relentless pressure on our national leadership. Their immediate objective continues to be the weakening of the Taft-Hartley Act.

Our great bulwarks of free enterprise and individual liberty can be as readily destroyed by the appeasement of socialist forces at home as by the appeasement of Communist forces abroad. To the extent the national leadership appeases on either front, the fundamental institutions of our nation are threatened.

We vigorously oppose the following suggestions for amendment of the Taft-Hartley Act:

1. To permit further extensions of the principle of compulsory unionism under governmental sanction;
2. To outlaw State laws regulating or prohibiting compulsory unionism;
3. To eliminate any safeguard against communism in unions;
4. To permit replaced economic strikers to vote in representation elections;
5. To relax the prohibitions and procedures against secondary boycotts;
6. To qualify the exemption of supervisors;

7. To reduce union responsibility;
8. To relax limitations on the check-off;
9. To permit unilateral administration of welfare funds by unions; and
10. To encourage strikes during contract negotiations.

It is essential that the task, commenced in 1947, of establishing a fair code of labor legislation be completed. To this end we again urge that the Act be amended to:

1. Prohibit compulsory unionism in any form;
2. Prohibit labor monopolies and industry-wide bargaining;
3. Uproot communistic influence from the internal affairs of the unions;
4. Require the President, in threatened national emergency strike or lockout situations, to utilize the provisions of the Act;
5. Safeguard, from union encroachment, the functions of management and the rights of workers;
6. Effectively outlaw mass picketing, violence, intimidation and similar terroristic devices in labor disputes;
7. Effectuate the requirement that decisions of the National Labor Relations Board be based upon the preponderance of evidence;
8. Restore stability to labor agreements;
9. Preserve to the states their right to regulate strikes and picketing; and
10. Effectively protect freedom of speech.

The fight to curb monopoly control of our economy by labor leaders deserves the active support of all loyal Americans. To the continuation of that fight we pledge our unceasing efforts.

tive action, and we should promptly proceed to amend that Act.

"I know that the Congress is already proceeding with renewed studies of the whole subject. Meanwhile, the Department of Labor is at once beginning work to devise further specific recommendations for your consideration."

Here was no inkling of White House policy. Several more weeks of silence elapsed. Some time after the Congressional committee hearings had commenced, the White House announced, through Senator Taft, that no amendments would be sponsored by the Administration until the hearings were concluded.

Hold Committee Hearings

It would serve no purpose to attempt to describe in detail what took place during the course of the hearings. The House Committee hearings lasted twelve weeks. The Senate Committee hearings were five weeks in duration. The spokesmen for the AFL and the CIO avoided a direct recommendation that the Taft-Hartley Act be repealed but proposed specific amendments which in quantity and in substance added up to repeal. The labor spokesmen pulled all of the old stops which they had been using since the enactment of the law. They presented a solid and imposing front designed to swamp the Taft-Hartley diehards and to capitalize on the lack of coordination displayed by industry as a whole. Some of the larger employer groups, whose spokesmen appeared among the first of the industry witnesses heard by the House Committee, took an extremely conciliatory position, dictated, apparently, by the attitude of appeasement which characterized the opening sessions. It can be said without exaggeration that the spokesmen on behalf of the American Mining Congress were the first to match the militancy of the labor unions and to urge unequivocally and with specific recommendations the strengthening of Taft-Hartley in almost all of its phases.*

The Major Issues

Naturally, the extended testimony before the two committees covered almost every section and sentence of the Taft-Hartley Act, but certain issues predominated in the discussions, either because of emphasis on the part of witnesses or because of questioning by committee members. These issues can be listed as follows:

1. Compulsory unionism.
2. Industry-wide bargaining.
3. Communism in labor unions.
4. National emergency strikes.
5. Administration of the law.
6. Secondary boycotts.
7. State regulation of strikes and picketing.

8. Freedom of speech.

9. Right of replaced economic strikers to vote.

The enumeration of these major issues should not be misunderstood. There are many other issues which are of considerable importance. Action one way or the other on a number of them could drastically affect the Taft-Hartley Act. And one may rest assured that the labor bosses, arch foes of what they call the "slave labor law," will exert every effort to have all of them resolved in favor of increased power for labor unions over the economy of the nation. Accordingly, no issue, no matter how insignificant it may appear at first glance, should be overlooked in watching developments with respect to Taft-Hartley revision.

A Look at Congress' Actions

No revisions of the Taft-Hartley Act were enacted at the recently concluded session of the 83rd Congress. Strangely enough, this was a victory for those who favored strengthening of the Act. This is so because the Committee hearings opened in an atmosphere of appeasement towards labor and with the forces of labor well organized and prepared to ride roughshod over its uncoordinated and hesitating opposition. The silence of the White House indicated the possibility that President Eisenhower was not concerned with what appeared to be an inevitable rout of those who feared for the national welfare if the labor bosses regained absolute power. The odds at that time were strongly in favor of Taft-Hartley revisions' reaching the Congressional floors which would meet substantially all of labor's objections to the Act and, in effect, restore the Wagner Act. That this did not come about can be attributed to three principal factors, namely, doubt as to the Administration's position, a stalwart group in the House Labor Committee, and a few employers and employer groups who had convictions and advanced them fearlessly.

Administration Makes Move

It certainly appeared that the Taft-Hartley issue would remain quiescent until Congress reconvened in January, 1954. Nevertheless, on the morning of July 31, only a few hours before the death of Senator Taft, there were sent to the Chairmen of the Senate and House Labor Committees, respectively, copies of a message which the President apparently intended to send to Congress on the subject of Taft-Hartley revision. Because of the contents of the message and the ill-advised timing of its delivery, a furor arose and the message was not officially delivered to Congress. However, the cat was out of the bag and the

Administration's probable position on Taft-Hartley became known.

The message, later termed by the White House to be a "preliminary draft," contained nineteen specific recommendations for amendments to the Act. Sixteen of them favored positions taken by the labor bosses. One embodied a clarification which was sought by employers. At least as of July 31, the Administration appeared to have made its decision and to have chosen to side with the one political group which, without substantial deviation, supported the continuation of Truman labor-socialism and opposed the election of Dwight D. Eisenhower as President of the United States.

The July 31 Leak

Time and space will not permit a detailed presentation of the July 31 recommendations for the revision of Taft-Hartley. On the seemingly valid assumption that wherein the Administration failed to recommend a change in the law it would oppose any change, the quickest way to evaluate the proposals is to see what their effect would be on the nine major issues which were listed above as having developed in the course of the Committee hearings.

1. Compulsory unionism.

Six of the nineteen recommendations involved an extension of the principle of compulsory unionism under governmental sanction. One of them would operate to invalidate all state "right-to-work" laws.

2. Industry-wide bargaining.

No recommendation was made and presumably the Administration would support the labor bosses in opposing any restrictive amendments on this subject.

3. Communism in labor unions.

The Administration recommended the elimination of the present non-Communist affidavit provision without offering any substitute. It specifically turned thumbs down on a new, separate law to cope with the problem as such.

4. National emergency strikes.

No recommendation was made on this issue and presumably support would be given to those who favor continuation of the present provisions.

5. Administration of the law.

The Administration specifically opposed the recommendation that the membership of the National Labor Relations Board be increased. It made no mention of the suggestion for further separation of the prosecuting and judging functions of the Board and presumably would oppose such a move.

6. Secondary boycotts.

The Administration went right down the line with labor on this sub-

ject. It recommended the elimination of the so-called mandatory injunction, the elimination of the prohibition against secondary boycotts on "struck work," and the elimination of any secondary boycott prohibition where construction projects are involved.

7. State regulation of strikes and picketing.

The recommendation was made that the states be clearly excluded from regulating strikes and picketing, except where violence occurs.

8. Freedom of speech.

No mention was made of this issue and presumably the Administration condoned the restrictions on freedom of speech which have been imposed by the National Labor Relations Board.

9. Right of replaced economic strikers to vote.

The Administration attempted to straddle this issue but in so doing proposed to disenfranchise all employees for a four-month period following the commencement of a strike.

Here, again, the reference to these nine issues should not lead anyone to ignore the rest of the Administration's recommendations. To mention a few, they would relax one of the restrictions on the check-off, they would relieve unions of certain filing requirements, they would reduce the 60 days' notice period on contract modifications and termination to 30 days, they would eliminate the penalty for striking during the "cooling-off" period, they would reduce the responsibility of unions for acts of their agents, and they would narrow the exemption of supervisors. That is sufficient enumeration to show what would happen to Taft-Hartley if the Administration's July 31 proposals were enacted into law by Congress.

Secretary Durkin Resigns

On September 10 the White House announced the resignation of Martin P. Durkin as Secretary of Labor. Later, on the same day, Durkin held a press conference in which he indicated that the controversy over the July 31 recommendations was the cause of his resignation. He said that he had had an agreement with the President's White House assistant, not with the President himself, that the July 31 recommendations would be backed by the Administration, but that that agreement had been repudiated. Subsequently, however, Durkin asserted that the President himself had specifically approved and agreed to support the July 31 recommendations. With reference to this assertion the President stated generally, in a press conference on September 30, that he had never broken an agreement with an associate.

No particular purpose would be

served by attempting to determine exactly what transpired within the official family to produce the drastic July 31 recommendations. Some say, on claimed good authority, that the President actually read and signed the abortive "message." Others say that he did not. Suffice it to point out—and there is no dispute on this point—that the White House assistants on whom the President relies for advice and staff work on such matters did take an active part in the production of that "message." This should be warning enough of what may ultimately emerge as the official recommendations of the Administration on Taft-Hartley revision.

Future Prospects

Spokesmen for the Administration have indicated that shortly after the 83rd Congress reconvenes the President will state the Administration's



Their fundamental liberties are at stake

specific and official recommendations for revision of the Taft-Hartley Act. Recently the new Secretary of Labor, James P. Mitchell, stated in an address delivered at the annual CIO convention that he, personally, would work for the elimination from the law of those provisions which are "really dangerous to labor, really loaded, really unfair." He did not indicate the provisions to which he was referring, but presumably he has the mistaken belief that there are such provisions in the present law.

It can be anticipated that the Administration will recede to some extent from the extreme positions represented by the July 31 recommendations. Nevertheless, an attitude of labor boss appeasement still seems to be the touchstone of Administration policy on Taft-Hartley. It can therefore be anticipated that the recommendations ultimately made by the Administration will include many

which, at least if enacted in combination, would substantially weaken the Act.

In the light of events which have occurred during the past six months the revision of Taft-Hartley during the second session of the 83rd Congress has become a distinct possibility. The Administration is preparing to take a definite position and that position will probably be one which, in the main, will cater to the political power which Administration leaders still believe to be possessed by the labor bosses. The outcome will depend on the extent to which the pressure of that alleged power, having acquired the respectability of endorsement by the Administration, will influence the members of Congress in their deliberations and in their voting.

Affirmative Action Needed

Those who favor the retention and strengthening of Taft-Hartley could easily have lost the 1953 Congressional round by their apathy and lack of concerted effort. The danger of their sustaining a knock-out in 1954 will be enhanced if, as may well be the case, the Administration appears in the corner of their opponents. The July 31 recommendations placed in the hands of the labor-socialists, now a minority in Congress, a political weapon which has rebolstered their courage and accelerated their pace.

The current situation requires immediate affirmative action on the part of those who realize the ultimate effects of unbridled labor bossism on our fundamental system of government, on our fundamental economic system and on our fundamental liberties. It should not be overlooked that a majority of the Congress is on the side of those who have that realization.

Some will say that the July 31 proposals, or such of them as may be embodied in the Administration's final recommendations to Congress, taken individually, are relatively harmless. That is not true. But assuming that it were true, nevertheless, as a whole those proposals mark the turning point on the road back, an opening wedge to the eventual re-establishment of the black era of the Wagner Act. They therefore represent everything against which the American Mining Congress and others of a like mind have fought unceasingly and successfully over the past seven or eight years. The present Administration is not infallible, and on the subject of Taft-Hartley revision it is being grossly ill-advised. Members of Congress who might otherwise follow blindly the lead of the Administration on this vital issue must be shown the error into which they are being led. The moves to accomplish that demonstration must be made immediately.



From Climax at an elevation of 11,320 ft. near Fremont Pass, Colo., comes a major portion of the world's molybdenum

Developments For Increased Production at Climax

Improved Equipment, Methods and Controls Helped Achieve and Maintain Daily Production of 10,000 to 12,000 Tons

By JOHN M. PETTY

*Mine Superintendent
Climax Molybdenum Co.*

THE caving system at Climax today is the result of many years of evolution. After attempts at mining by open stope methods and an adaptation of an alternate cave and pillar system, a caving system has developed adapted to the rock and structure of the ore-body and to production requirements.

The slusher system has been worked to its present stage of operating efficiency in a period of 17 yr. Prior to 1936, production was by the chute and grizzly system. Since then the slusher system has proved to be safer and more efficient. It allows better control, better ventilation with consistently higher rates of production.

Haulage

Two important improvements in haulage in recent years were the introduction of trolley-radios in our haulage system and the addition of improved haulage motors.

The Phillipson Level has been in production since 1931 and the Storke Level, 300 ft below, since February,

1953. Loading areas on both these levels are reached by a single track adit over 3000 ft long. Dispatchers with interlocked electric controls are stationed at each end of the adits. Empty ingoing trains are dispatched through the footwall or fringe drift into haulage drifts for loading. In addition to a Bell telephone and mine phones, each inside dispatcher has a radio for constant contact with all the motor crews. After the train has been loaded, it proceeds to the hangingwall or fringe drift and is dispatched outside to the crusher, and back underground. From the time a train leaves one loading drift until it returns it is under control of a dispatcher. The trolley phone units have improved production efficiency and aided safety and permit closer supervision.

Trolley phone units at Climax are frequency modulated, carrier-type radios. To avoid confusion between haulage levels, the frequency of the radios on the Phillipson Level is 100

kc and on the Storke Level it is 61 kc. These radios are shock-mounted in the motor-cabs to withstand concussion and vibration. All component parts are of the plug-in type to make servicing extremely simple. The only service equipment needed is a volt-ohm meter and a tube tester. With a minimum of instruction, anyone can service these sets. Blast-proof speakers proved inadequate for the concussion here, and a concussion grill was developed to prevent further damage.

The new 36-in. gauge locomotives that have been added to our haulage system weigh 27 tons and were designed specifically for the Climax operation. These locomotives are four-axle, double truck units, 420 in. long, over-all without couplings, 59 in. wide and 80 in. high. The truck centers are 252 in. They have a maximum draw bar pull of 13,750 lb. and are operated with electro-pneumatic controls. These controls are actuated by solenoid valves with air control. The unit is equipped with both dynamic and air brakes; the air brakes have separate valve control for the motor only or for motor and train. The motorman's enclosed cab is in the center of the locomotive with 360° visibility. Included in the cab are the power controls, air brake valves, dual pressure gauges, emergency hand brakes, trolley-radio transmitter and receiver and cab heaters.

All locomotives are equipped with sealed-beam lights and air horns. Experience has proved that good visibility and warning signals are essential to safe haulage.

All switch stands and signs used to direct train movement are made from reflectorized paint or paper. Electrically controlled derailleurs are used as safeguards to prevent train crews from "running" red lights and to stop trains that are out of control. All signals, derailleurs and electric eyes are operated by the dispatcher from an interlocked electric control board.

Ventilation Planned

Ventilation of the Phillipson Level was effected after the mining of this area was completed. Ventilation on the Storke Level was carefully laid out and installed when the slusher drifts and haulage drifts were driven.

Fresh air reaches to the Storke Level through a ventilation raise 152 sq ft in area. The intake fan is a 96-in. Axivane type fan operating at one-in. water gauge and delivering 200,000 cfm. This fan discharges into a ventilation lateral which parallels the hangingwall. Ventilation overcasts are built at approximately right angles to the haulage drifts and are used to direct the flow of fresh air into the haulage drifts that are being worked.

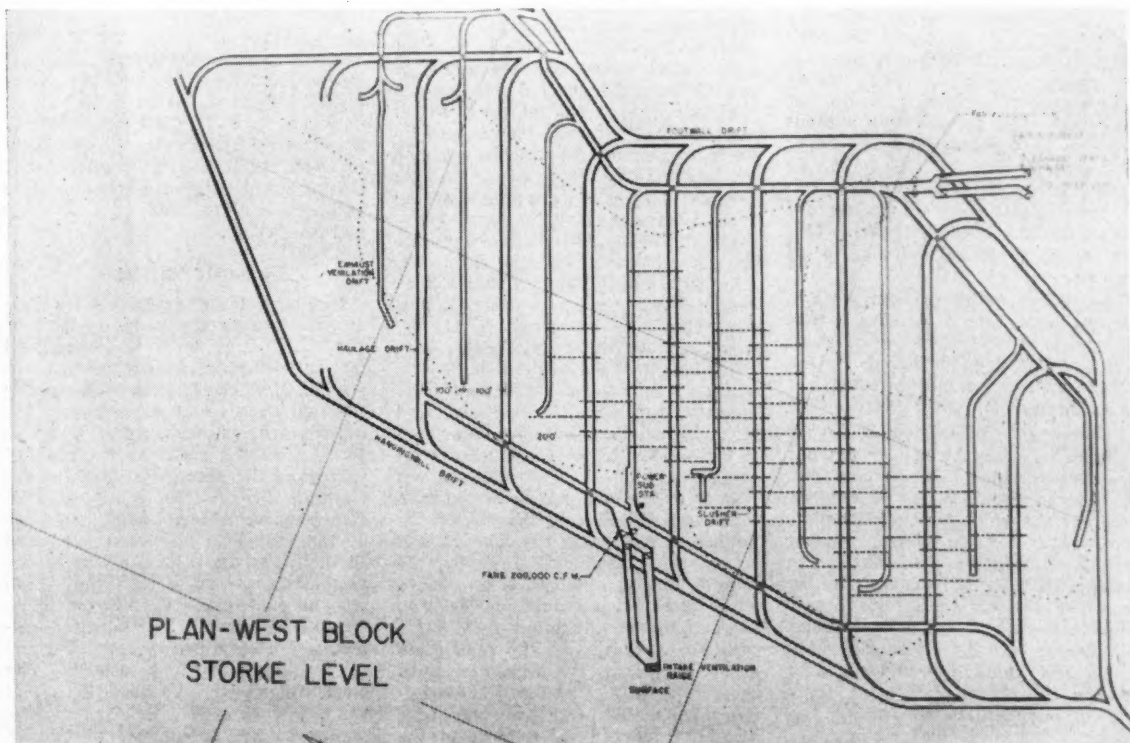
At the opposite end of the block, an exhaust ventilation lateral parallels



Radio replacement parts are unitized for easy servicing

the footwall drift and the contaminated air is exhausted to the surface via an exhaust raise 230 sq ft in area. The exhaust fan is a 108-in. Axivane type fan delivering at the present time 200,000 cfm. The ultimate duty of this fan is to be 350,000 cfm. Where exhaust drifts intercept the haulage-way, the overcasts are sealed to prevent recirculation of contaminated air through the mine.

Midway between, and parallel to, the haulage drifts are five by seven-ft ventilation drifts, driven at haulage grade and elevation. Each slusher drift is connected to this ventilation drift by means of a short raise, near the endlog, and a 20 by 20-in. concreted box. This allows a single ventilation drift to exhaust air both from the slusher drifts on the south side of the haulage drift and from the slusher



Ventilation on the Storke level was carefully planned in advance

drifts on the north side of the adjacent haulage drift.

Fresh air under pressure in the haulage drifts enters the slusher drift through the lean-to and draw hole, thus keeping the hoist operator in an area of fresh air. Action of the exhaust fan draws the air to the rear of the slusher drift and through the ventilation box and raise into the exhaust ventilation drift, from there to the main exhaust drift, to the fan, and up the surface raise to exhaust to the surface.

In conjunction with the ventilation, each slusher drift is furnished with an air-water blast spray. This is turned on when blasting and operating crews can return to the slusher drifts almost immediately after secondary blasting.

Slusher Drifts

The design of the slusher drifts and the operation of slushing equipment constitute one of the most important phases of Climax operations. Factors considered are ventilation, control of ore, secondary blasting, wear, maintenance of equipment, safety, efficiency and speed of loading.

Early double-ended slusher drifts with center mounted hoists did not allow for proper ventilation, visibility, draw control, protection of slushing equipment, or support of hoist. To improve this situation, the slusher hoist was mounted in the slusher drift opposite the side to be drawn, about 15 ft back from the center line of the draw hole. This improved the visibility, permitted handling larger rock, improved ventilation and cut down on maintenance of equipment. It did not allow both sides to be drawn without changing the slushing equipment over to the other side of the drift. To remedy these problems future development was planned with single-ended slusher drifts at a closer spacing. This has proved to be satisfactory in all respects.

Timbering of the haulage drift is planned at the time of driving so that timber sets are spaced to conform with slusher drifts. The slusher drifts are driven on 34-ft center lines normal to the haulage drift.

The sequence of mining a slusher drift begins with the hopper cut out driven to specified height and width. The height provides for a crawler beam and the width for a service platform, ventilation lean-to and manway landing. Sufficient room is left in the haulage drift for the manway and a place for the car-spotter to stand. From this cut out, one nine-ft round is driven in both directions along the slusher drift center line and mined to size for concreting the entire draw hole cut out. Before concreting, the hopper is installed. This consists of two prefabricated side girders, four ft

high and 15 ft long, with 65-lb rails welded horizontally for prevention of wear; two five by eight-ft aprons, one for the slusher drift side of the hopper with wear rails welded on top and support rails on the under side (the eight-ft dimension sets the girder spacing); the other apron on the hoist side set on a 40° incline, of the same construction, heavy angle iron, box-beam or channel used to support the aprons at the draw hole, and one cast manganese draw hole frame.

"A" sets are used to support the hopper steel during concreting and may be removed after the concrete has been placed. This is optional as they afford enough clearance when in place and add to apron support. The apron steel is placed to allow a distance of 4 ft ¼ in. between aprons forming the draw hole. The distances from the center line of the haulage drift are 2 ft 7 in. toward the slusher drift and 1 ft 5 ¼ in. toward the hoist room.

The cut out section is designed so that from side girder to side girder is eight ft and from apron to top of the cut out is 12 ft 6 in. The cut out is concreted over the back and down the lean-to with a minimum of one foot of concrete. The side girders are formed within the concrete lines, thus anchoring them securely and allowing a clearance of seven feet between concrete lines at the drawhole.

A four by seven-ft manganese draw hole frame is installed on the center line of the slusher drift and held in place by the heavy steel members of the aprons. The beams are held in place by two-in. diam round mild steel rods welded to the side girders. The draw hole frame is bolted to the beams with four 1½ by 5 in. countersunk bolts on each side. Plates ¾ by 8 by 54 in. are welded on top of each side of the draw hole frame and to the side girders to keep the draw hole frame from moving upward.

On the hoist side of the draw hole the second apron is placed on an incline with added 60-lb rails welded on center line of the plate. This plate is supported and cushioned by 12 by 12-in. timber or heavy beams and welded on each end to the side girders. The plate is on an angle to enable the operator to watch the ore cars and keep the rock from building up around the slusher. After the hopper steel has been aligned, the cut out and lean-to are formed and concreted with legs on both sides to the sill of the haulage drift. After the concrete has set up, the slusher drift is driven 107 ft long, nine ft wide and 12½ ft high. The last round is reduced in size and the bottom brought up on a 45° angle for the installation of the ventilation slot which forms the connection with the ventilation drift below. The original steep incline of the slusher drift has been reduced to three ft in the length of the drift. Inclined slusher

drifts were discontinued as they limited the operator's visibility and created a dangerous condition for men working on the lower side of the fingers.

If the rock in the slusher drift is strong enough, the finger excavation is made at this time. These are made on 33-ft centers along the slusher drift and directly opposite each other. They are driven on a 45° slope, 12 ft wide and eight ft high. The finger bottom is started 18 in. above the slusher drift bottom.

The slusher drift is driven with a 60 hp development slusher mounted on the opposite side of the steel hopper. The drift rounds are drilled with two 3½-in. drifters on four-ft aluminum shells using carbide bits and alloy steel. They are mounted on a vertical column and cross-arm that in turn is mounted to a cross-arm on the dipper. After the previous round is mucked out, the column and cross-arm with machines attached are bolted to the dipper cross-arm by means of a universal and pulled to the face with the column in a horizontal position. The cables are unhooked from the dipper and connected to the top of the column and the slusher pulls the column into a vertical position for drilling. The brakes are set on the slusher drums and the set-up is ready for drilling. This makes a fast set-up and eliminates heavy lifting and packing because the drilling equipment must be removed from the slusher drift before blasting each round.

After the slusher drift and finger excavations are completed and the drift cleaned out to solid, the drift is driven in the opposite direction, 14 ft high, 10 ft wide and 26 ft long in an arched section from the center line of the loading drift for the slusher hoist cut out. After this is completed, the slusher drifts, fingers, vent connection and cut out are ready for forming and concreting.

Concreting

Our newest slusher drift bears little resemblance to the slusher drift of 1933. The first drifts were designed to handle larger material with more speed and efficiency than was possible through chutes and grizzlies. In the development of slusher drifts, it was found that the rock itself could not withstand the abrasiveness of the ore running through the fingers, concussion from secondary blasting and wear of the dipper as it moved back and forth in the drift. The brows of the fingers broke out so high that there was no control of the flow of muck. Often the slusher drifts were completely filled and the operation became very dangerous and costly. The slusher drift bottoms wore deep and the ribs wore wide.

Many types of support were tried at the brow of the finger, including

timber sets, heavy logs with steel wearing plates and steel sets made of heavy box beam. None of these proved satisfactory and in 1939 concreting was started as a means of ground support and to prevent wear at the fingers. Since that time 150,000 cu yd of concrete have been poured on the Phillipson Level. On the Storke Level alone 75,000 cu yd of concrete have been poured up to August 1 to put the first 16,000,000-ton ore block into production.

Batching Plant Outside

To prepare the concrete for underground, the sand and aggregate are elevated into hoppers at an outside batching plant. This material is then weighed and dumped into individual compartments of the aggregate cars. Each car has 24 compartments which hold the aggregate for $\frac{1}{2}$ -cu-yd batches of concrete. Under the compartments of each car is a conveyor belt that dumps the aggregate into the mixer hopper. At present, sacked cement is added by hand at this point, but bins and aggregate cars are being modified to handle bulk cement and thus eliminate one hand operation. From the mixer the concrete is elevated into a pumperete machine by a conveyor belt and then pumped through a 6-in. line into the forms.

All underground concreting equipment is adapted to 36-in. gauge track and the power for operation and transportation of this equipment is taken from 275-volt dc trolley lines. This lends itself to easy moving and fast set-ups.

Steel Forms Standard

Wood forms were built for the first concrete work in slusher drifts. This was economical while the design of the slusher drift and fingers was going through the many changes. In 1947 steel forms were purchased for the slusher drift concrete work and have been made standard items of equipment. The standardization of the cut out for a particular hoist has allowed the use of steel forms for this also.

The new single-ended slusher drifts are concreted seven ft wide by $9\frac{1}{2}$ ft high. Seven ft is the best width for the six-ft scraper operation. The height has been increased to $9\frac{1}{2}$ ft to allow fingers with badly worn brows to be pulled longer. It has also increased the life of the tail slusher cable.

First concreted floors were poured with eight parallel 60-lb rails with ends welded together running the length of the drifts. As the dippers increased in size and weight, these rails were quickly torn out. Newest floors are poured with staggered series of parallel rails with $1\frac{1}{2}$ ft of the ends bent down 45° and imbedded in concrete which is poured to the balls of the rail. The slusher drift has to be driven $1\frac{1}{2}$ ft below the finished grade to allow for this.

Protect Brow of Finger

After the bottom has been poured, the steel forms are put in place for the slusher drift and fingers, including the "H" beam anchor for the tail

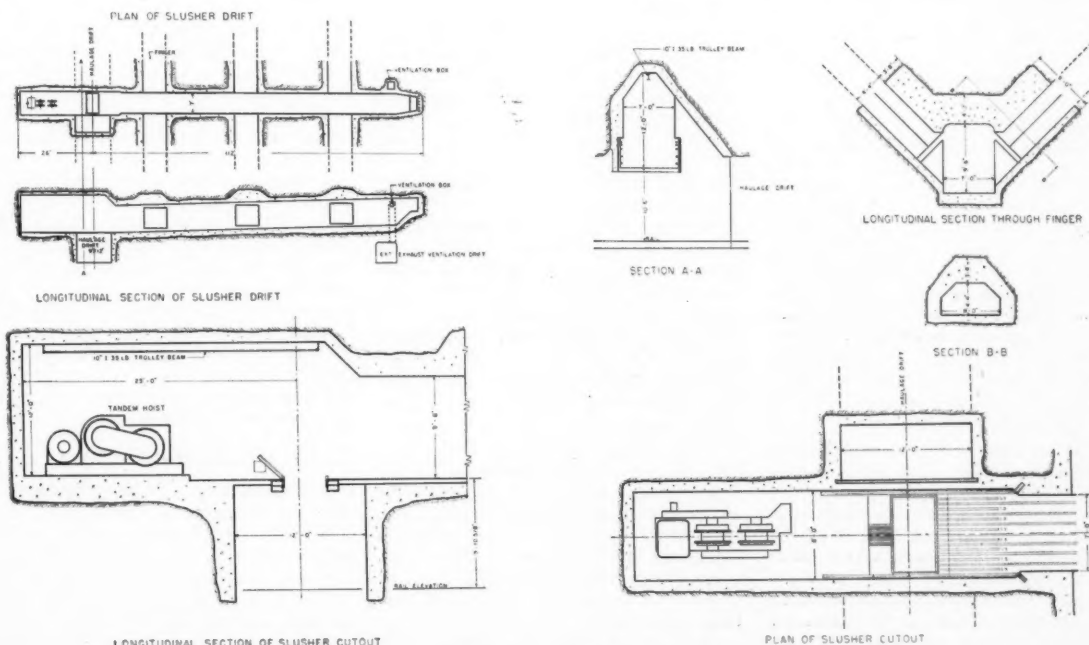
sheave, idler sheave in back, and the 20 by 20-in. ventilation box. The nine by $12\frac{1}{2}$ ft size allows for one-ft minimum of concrete in the walls and $1\frac{1}{2}$ ft for floor and back. When the fingers are reamed, extra ground is taken out of the back to allow for $3\frac{1}{2}$ ft of concrete at the brow. This is the important control point and must be maintained for the life of the finger. Reinforcing steel is used in the cut out to strengthen it, but all steel has been eliminated from the concrete in the fingers and slusher drift.

Finger design has been changed frequently. The present fingers are concreted eight ft wide, $4\frac{1}{2}$ ft high and eight ft long with the bottoms and backs on a 45° slope. The bottoms extend five ft beyond the vertical plane of the concreted backs to aid in eliminating hang-ups. The backs of the fingers are arched to correspond with normal wear. Most rocks that enter the unconstricted finger come through without blasting. The bottoms of the fingers are raised six in. above the drift floor to prevent banking and choking in the fingers.

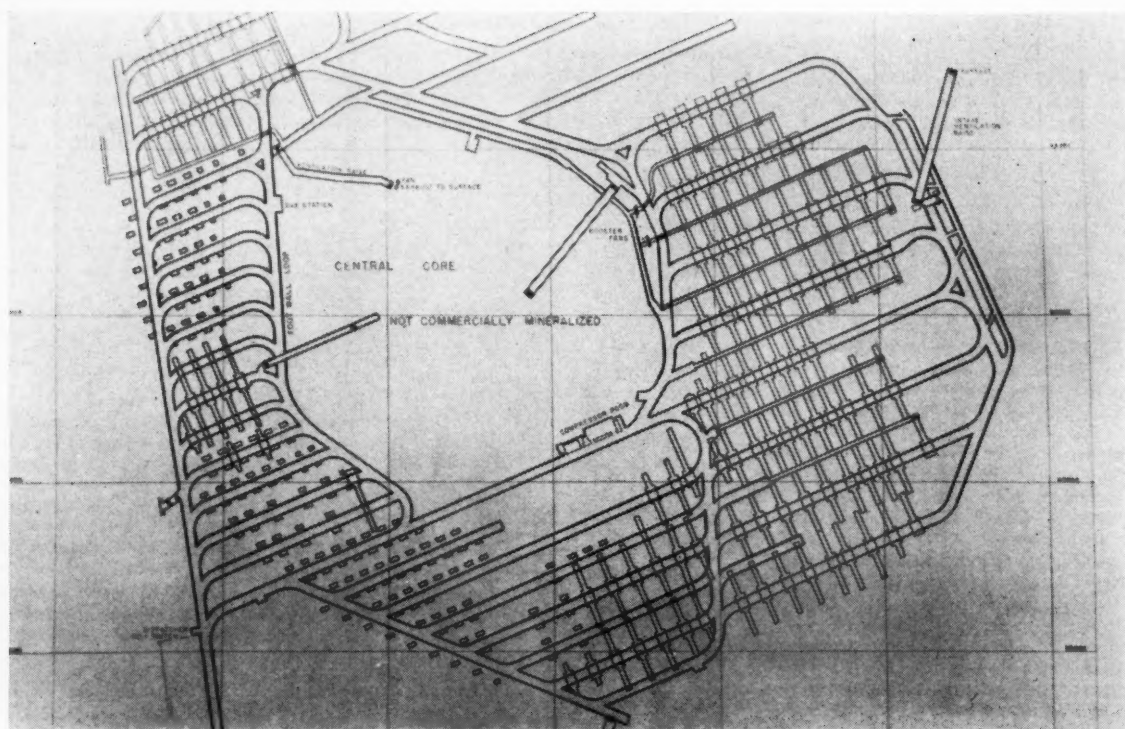
The ribs of the slusher drift are reduced to four ft just in front of the tail sheave to protect the sheave from damage by the scraper. The ventilation duct between the slusher drift and the ventilation drift has slots concreted into it to allow for closing the opening if the drift is not being worked.

Slushing Equipment

Newest and most satisfactory hoist for slushing is a tandem two-drum



The newest slusher drift bears little resemblance to the earlier double-ended slusher drift



Ventilation system on the Phillipson level evolved as mining progressed

hoist powered by a 150 hp high-slip motor. The hoist has a 17,000-lb rope pull at a rope speed of 280 fpm with the drum half full. The hoist is held in position with 17-1/4-in. hold-down bolts imbedded in the concrete base.

Several changes have been made since the first tandem was tried out here. Chain cases are made out of 1/4-in. plate with air louvers in them which protect them against concussion. The seams are reinforced with 1/2 by two by two-in. angle iron. The motor is mounted on a sliding base which allows adjustment for chain take-up. This has proved to be much more satisfactory than a weighted chain take-up. Rope guards have been changed to use two horizontal rollers only. The vertical rollers and top horizontal roller have been replaced with manganese wearing shoes. The number of planetary gears has been increased in each housing from two to three in order to eliminate the wobble in the drums. This also gave better alignment of the internal gear and planetary gear train.

Drum diameters were changed from 33 to 38 in. This allowed for air gaps of 1 1/2 by 5 1/2-in. openings, equally spaced between the clutch drum and the planetary gear system. The air gaps permitted the drums to run cooler and increased the clutch surface. The heat caused most lubricants to carbonize and produce a residue which prevented proper lubrication of the planetary gears and bearings.

The nose and tail drums are equipped with snubber brakes to avoid excessive back-lash of the cables. The tail drum is also equipped with a manually operated hand lever that is connected to the tail snubber brake. The cable can be tight-lined and kept free from the flow of ore when fingers are blasted in.

The hoist is powered by a 150 hp, 60 cycle, 3 phase, 440 v high-slip motor. At the rated 150 hp it has 835 rpm. It is an all steel fabricated motor with one-in. armor plate wrapper, one-in. reinforced end shields and a continuous 2 1/4-in. slab foot. It weighs 3950 lb and has a stall torque of 4200 lb-ft.

Fifteen hoists in operation since the middle of February, 1953, were checked. In 5 1/2 months the 15 hoists have pulled 1,000,762 tons for an average of 66,717 tons per hoist. High tonnage on a single hoist was 106,266 tons.

Twenty-three hoists of the above description were installed on the new Storke Level to maintain a daily production of from 10,000 to 12,000 tpd. One man is assigned to do the lubrication and checking of all slushing equipment daily. If any repairs are necessary, the hoist is shut down immediately and repaired. This daily check and preventive maintenance has practically eliminated repair costs on this installation.

"A-1" used cable is stocked for these hoists. The tail cable is 1 1/4-in.

diam and 375 ft long. The nose cable is 1 1/4 in. and 275 ft long. On the fifteen hoists checked, a set of cables averaged 27,798 tons before being replaced.

An 18-in. tail sheave is anchored to the 133-lb H beam that was imbedded in the concrete.

The six-ft folding hoe type scraper, developed at Climax, is used for loading. The scrapers are 56 in. high when opened and 26 in. high when folded. The operator can control the opening and folding action with the slusher controls. When going toward the tail sheave, the folded scraper rides over the ore in the slusher drift rather than pushing it back and causing damage to the cables and tail sheaves. The scraper prevents the ore from building up and choking at the mouth of the finger.

To protect the operator from broken cables, a swinging gate made from one-in. and two-in. pipe is hung in front of the operator. The guard allows satisfactory visibility of work and ample protection.

Blasting Practices

Proper blasting is very important for safe and efficient production. Experiments are continuous in an attempt to find more suitable explosives and methods to improve our practices. Underground magazines are located as conveniently as possible to working areas but away from main haulage ways.

Bulldozing powder is 45 per cent semi-gelatin type packed in flat ten-lb bags. A high percentage of the secondary blasting is performed in the fingers after securing powder to the end of long blasting sticks. Bag powder saves time and benefits clean-up. A fast detonating fuse, Primacord, is tied to the bundle of powder and primed in the slusher drift. This enables the blasters to shoot several fingers at a time and to be in a safe area at the time of igniting the shot. Three-ft primers with No. 6 caps are made up for the production crews.

High pressure water is sometimes used to bring in hang-ups. This method saves explosives and eliminates serious dust conditions.

Stoping

The fingers are advanced by the development crew from the end of the concreted finger. They are mined on a 45° slope, eight by eight ft in size, to the standard 33-ft horizontal spacing to what is called the draw point of the fingers. At right angles to the finger, and through the center line of the draw point, sidelines are driven on 45° slope, eight by eight ft in size, to apex with sidelines driven from the two adjacent fingers. Dogholes are driven through the pillar on center lines of the undercut apexes.

This work is done with a standard 18-in. change, self-rotating stopper with 2½-in. cylinder. Alloy drill steel and 1½-in. carbide bits have improved this operation. Experimental work is per-

formed continuously in an effort to improve present equipment.

The pillars that remain from the undercutting are drilled to complete the stope for final blast and caving. The pillars are drilled in a definite pattern with horizontal longholes. Four holes are drilled in each vertical row, three ft apart. The two center holes are drilled completely through the pillar, and the top and bottom holes are of equal depth to avoid leaving stubs when pillars are blasted. The bottom holes form a 45° slope for the sides of the funnel to the draw point, and the top hole acts as a buster to promote initial caving action.

Machines used for longholing are 3½-in. drifters on four-in. aluminum shells mounted in the undercuts on vertical columns and cross-arms. Alloy drill steel couplings and carbide bits allow drilling a wider pillar from a narrower undercut at a reduced cost. Prior to these improvements, the undercuts had to be wider than the thickness of the pillar to allow for changing of conventional drill steel.

To supply adequate and constant air pressure, 1½-in. hoses are used on all longhole drilling. We have standardized on 2½-in. drill bits to provide proper hole size, so the coupling will follow for the life of the bit. The two-in. bit did not allow this.

Longholers are loaded with 45 per cent semi-gelatin stick powder and timed with millisecond electric delays.

The timing is started from the brow-holes over the draw point, proceeding upward to the apexes. The order of blasting pillars is to retreat by single rows from the previous cave area. Slushing of blasted ore should follow each blast to allow ample room for the swell from the next shot. This also affords safe inspection for misfires and stubs from the previous blast.

Flexible plastic pipe with short, wooden loading stick inserted in the end has replaced jointed loading sticks in the narrow undercuts. Smaller plastic pipe has replaced coupled pipe for blowing holes previous to loading.

Conclusion

The foregoing description could not include all of the recent changes in operation and development. It is readily apparent from the numerous changes mentioned in equipment and practices that the operation has never remained static. Constant changes have forced improvements to meet ever increasing demands.

William J. Coulter, former vice-president and general manager, summarized the thoughts of our organization by saying, "The Climax organization believes that mining is as progressive a science as chemistry, medicine, physics, or any of the other sciences and that keeping abreast of improved mining methods undoubtedly will find many of the present-day underground practices antiquated and obsolete ten years hence."

Erie Goes Ahead

Elton Hoyt 2nd, president of Erie Mining Co., announced early in December that Erie has completed plans for financing the initial development of its program for the construction of facilities in Minnesota for ultimately producing taconite pellets at the rate of 7,500,000 tons a year.

This was the first official statement that Erie Mining is definitely going ahead with its large-scale taconite program. Work has already begun and may lead eventually to a total annual taconite pellet production of up to 10,500,000 tons involving the investment of more than \$300,000,000.

Erie has arranged to sell \$207,000,000 of first mortgage 4½ percent bonds, due in 1983, to a group of nine insurance companies and Bethlehem Steel Corp.

Erie Mining Co. is managed and operated for the stockholders by Pickands Mather & Co., of which Hoyt is senior partner.

Last year the Defense Production Administration awarded Erie Mining a certificate of necessity covering the project on a basis of up to 10,500,000 tons annual production, the cost of

the entire project then being estimated at approximately \$298,000,000.

Immediate development calls for the largest initial ore concentrating plant ever to be built, located near Aurora, Minn., and also includes the construction of housing facilities for the plant's employees and their families; a 73-mile railroad from the plant to Two Islands, Minn., on the north shore of Lake Superior, and a harbor, docks, and a large electric power generating station at Two Islands.

Erie Mining has under its control properties on the Mesabi Range sufficient for the production of ample raw material to protect the maximum requirements of the plant for more than 50 years.

The Engineering Department of Anaconda Copper Mining Co. has been employed to do the engineering, prepare plans and specifications, and be responsible for construction of the new concentrating plant. It will be located five miles north and east of Aurora and about two miles from the initial pit from which the crude taconite will be mined. The ore will be hauled to the plant by a mine railroad

and unloaded into primary crushers.

The single track, standard gauge railroad will be constructed to haul the outbound finished product from the plant to a port at Two Islands to be known as "Taconite Harbor," where the pellets will be loaded on ships. The route selected is favorable to track construction, requiring no long bridges and only one tunnel.

The harbor and docks at Taconite Harbor have been designed with ample capacity to handle the total projected annual production. Facilities will be provided for unloading inbound coal cargoes and for moving coal to the large electric power plant nearby which will generate electricity for the entire project, except for the townsite which will be supplied from existing sources.

"This development can be of great importance to the State of Minnesota," Hoyt said, "for it will provide substantial employment not only during its construction, but also in its future operation. Once again Minnesota will have a large reserve supply of iron material which, through the knowledge gained during more than 20 years of pioneering, can be transformed from uselessness into a vital national commodity."

Cooling Plants for Underground Workings—Part II

Air Conditioning Enables Increased Production from Greater Depths in Belgian Coal Mines

By ANDRE HOUBERECHTS

University of Louvain
Louvain, Belgium

WHEN airflow through mine workings has been increased to the greatest possible extent by a well-organized ventilation layout and by the use of equipment suitable for reducing pressure losses in the downcast shafts and in the intake airways, it is still possible to improve the climate by reducing the temperature of the air as it enters the face. Before thinking of using artificial cooling, it should be pointed out that an appreciable improvement can be obtained by eliminating certain important causes of heating of the air between the surface and the faces.

A critical examination of these causes suggests a whole series of possible improvements. For example:

- (1) Cooling compressed air at the surface or allowing it to descend via the upcast shaft.
- (2) Elimination of sources of heat around the downcast shaft, which are responsible for pre-heating intake air.
- (3) Installation of water lines in the upcast shaft, at least if the water flow in these pipes is capable of heating intake air.
- (4) Hoisting coal through the upcast shaft, in order to eliminate every possible cause of oxidation in the downcast shaft.

Of all these improvements, cooling the compressed air at the surface is the most easily carried out. In addition to the cooling effect at the face surface cooling of the air has another advantage. It reduces the specific volume of the compressed air which in turn reduces air speed in the piping and is reflected in lower pressure losses.

Rock Temperature Important

One quite important source of heating, which does not emerge as such from the above comments, is the cooling of the rock during the period between the driving of the headings and the moment when a stable thermal zone is established around them.

Calculation proves that the duration

of this transitory phenomenon is proportional to the specific heat of the ground and to its density and inversely proportional to its thermal conductivity. In point of fact, this cooling off, which is very rapid at the beginning, slows down exponentially and is virtually complete after two years.

The facts just reviewed explain the rapid rise in the air temperature in the roadways and at the faces—the surrounding ground has not time to reach its thermal equilibrium.

In spite of the inevitability of this transitory phenomenon, certain measures can reduce its effects. For example, pre-cooling of a cross-cut intended to serve a new district can

have a good effect on the climate of that cross-cut later on, especially during the first stage of its service. It is also advantageous, from the climatic point of view, to push ahead with development work and to ventilate these workings properly, long enough in advance of full mining. Finally, it is also helpful to use a type of roof support which will prevent frequent roof falls, since each fall is accompanied by transitory phenomenon of the same kind as that outlined above; however, in this instance, its effects are on a much smaller scale.

Cooling Is Expensive

Artificial reduction of the temperature of the air at the point where it enters the face is quite obviously a complicated and expensive solution to the problem. Consequently, it is not to be envisaged unless all other possible means for combating heating of the ventilation air have been exhausted. Air cooling is only effective with an abundant airflow. This is, in point of fact, a consequence of the increase in exchanges of heat between the cold air and the hot rock,



Hot mine air can be cooled by forcing it through a radiator containing cold water

new surfaces of which are constantly being exposed.

In actual practice, no appreciable improvement in the climate of the face will be obtained unless some 250,000 to 300,000 kcal/h (approximately 1,000,000 to 1,200,000 Btu per hr) can be removed from the air stream.

In these circumstances, there are only three possible solutions worthy of consideration:

(1) Cooling the ventilation air at the surface.

(2) Production of cold at the surface and its transport underground by means of a closed circuit of water or brine.

(3) Production of cold underground, near the workings, the heat removed from the air being returned to the surface by a stream of water.

Some discussion is necessary with regard to the choice between these three solutions. Let us point out at once that solution No. 3 was the first to be applied, experimentally, by the Charbonnages des Liégeois, in the Campine Basin, whereas the final cooling station, of great power, will be of type No. 2. Finally, the Charbonnages du Rieu-du-Coeur et de la Boule Réunis have already installed a cooling plant of type No. 1, which in its final form will also provide for the transporting coolant underground according to system No. 2.

It hardly seems suitable, for several reasons, to undertake simple cooling of all the ventilation air at the surface. In the case of a mine with several levels (by far the most frequent type in Belgium), the necessity for artificial cooling only exists in the majority of cases for the deepest level; the surface cooling plant would therefore cool all the ventilation air quite unnecessarily with an enormous consumption of power.

Apart from this, cooling the air at the surface would have very little effect on the temperature of the air where it enters the face, for two reasons:

(1) Even if the air were cooled to 0°C (32°F) at the surface, it would regain a temperature of from 10 to 15°C (50 to 59°F) at the bottom of the shaft because of auto-compression.

(2) The degree of cooling obtained at the surface is progressively lost along the shafts and the intake airways by reason of the increase in the exchanges of heat with the walls.

At first sight, one might be tempted to compare the cooling effect of air artificially cooled at the surface to the climate underground at that season of the year when the temperature of the outside air is the same as the artificially cooled air. This kind of evaluation entirely leaves out of account the thermal phenomena brought about by seasonal variations of tem-

Although cooling of mine air is not widely practiced in the United States at the present time, this article contains many practical and cost saving ideas which can be incorporated into present mine ventilation systems. It will also be of great value in mines where it is found necessary to extend the workings to greater depths, where air conditioning may be a "must."

perature. In a theoretical study, it can be assumed that the average daily temperature follows a sinusoidal curve whose amplitude is in the region of 10°C (50°F). This variation is repeated at every point in the air stream, but its amplitude decreases and it becomes progressively more irregular as the distance from the point under consideration to the point where the air enters the ventilation circuit increases. The same sinusoidal curve is also found for the ground surrounding the headings, but it is gradually damped down and thrown out of phase as the point moves away from the wall of the shaft or the heading. It is obviously the thermal inertia of the rock which causes this damping down and throwing out of phase of the temperature waves. The zone of ground where these waves are perceptible is called "zone of heat exchange."

A detailed study will show that a moderate but continuous cooling is capable of producing, in the long run, better climatic conditions at the face than those ordinarily achieved in winter.

Better to Cool Air Underground

Nevertheless, this is not the solution which will be adopted in mines with several horizons, where climatic difficulties are met only in the lower horizon. There, the method applied is that of cooling the air underground, and it only remains to decide the position for the cooling plant, either at the surface or underground.

Each system has its own limitations. A machine employed underground must use a refrigerant which is both incombustible and nonpoisonous. It must not take up too much space, so that it can easily be transported and installed underground. For this reason centrifugal compressors are indicated.

On the other hand, the installation of machines at the surface allows

centralization of a cooling plant to serve a whole district or even an entire level. If this central cooling plant is suitably equipped it will give a high degree of cooling efficiency, which may sometimes be twice that of a machine working underground.

These few considerations by no means exhaust the problem of choosing the location for the cooling plant. A better idea will be obtained after reading a description of the various solutions adopted to date in a Belgian mine where climate control in deep workings is practiced.

A Practical Example

There was no question of cooling all the ventilation air in the Charbonnages des Liégeois, where the climatic difficulties are principally felt at the lowest level (1010 m or 3300 ft). For this reason, underground cooling of the air was chosen.

The first plant used, which was of a distinctly experimental character, was a small one. Consequently, it was thought advisable to place the cooling machine underground not far from the face to be cooled. This position enabled the length of piping to be kept to a minimum, thereby cutting down the cooling losses, which are relatively greater for a small cooling plant than for a large one.

Water necessary for cooling the condenser is drawn from boreholes which penetrate a pocket of water near the surface. This water is brought to the cooling plant by pipes laid along the downcast shaft, the pressure being cut at several places along the line by equilibrium reservoirs. The lower part of the pipe is heat-insulated in order to avoid excessive heating of the water during its underground journey along the intake airways. The condenser is similarly protected against excessive pressure from the cooling water by means of an equilibrium reservoir situated some 10 m (32.8 ft) higher. Water leaving the condenser is car-



It is not generally necessary to air-condition the entire mine—only the deeper workings

ried to the sump of the 1010 m (3300 ft) level, whence it is returned by the drainage pumps to the surface.

On the evaporator side, the water circuit is completed by a circulation pump and a heat-exchanger placed in the immediate vicinity of the entry to the face. This heat exchanger consists of a system of gilled tubes, through which the cold water passes. A compressed air turbo-fan blows the air to be cooled through this system of tubes. A large-surface filter prevents the dust in the air from blocking the exchanger.

The exchanger is moved from time to time by simply sliding it along so that it follows the advance of the coal face. In point of fact, the efficiency of air cooling diminishes as the distance from the cooling point increases; the more recent the roadways, the more quickly this takes place. For this reason, it is important to keep the exchanger as near as possible to the working.

Results Have Been Good

Experience has completely confirmed the results promised by the theoretical considerations. A reduction in temperature of approximately 1°C (2°F) at the entry to the face is, for practical purposes, no longer perceptible at the other end of the face, because of the increased degree of heat exchange with the walls of the working. However, the initial cooling occurs below dew-point, so that a certain quantity of water is removed from the air current in the exchanger. The result is a reduction in the wet-bulb temperature of the air. This drying has allowed the use of water-spray pneumatic picks, which were previously excluded by reason of the excessive moisture content of the air. In addition, the net output per shift has been increased by some 25 percent, without the effective temperature at the exit from the face exceeding 30.5°C (87°F).

The encouraging results obtained

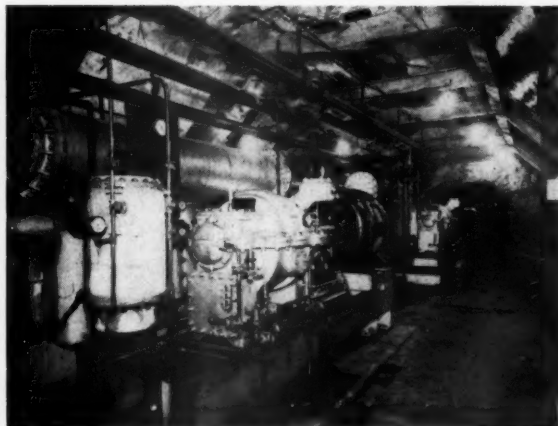
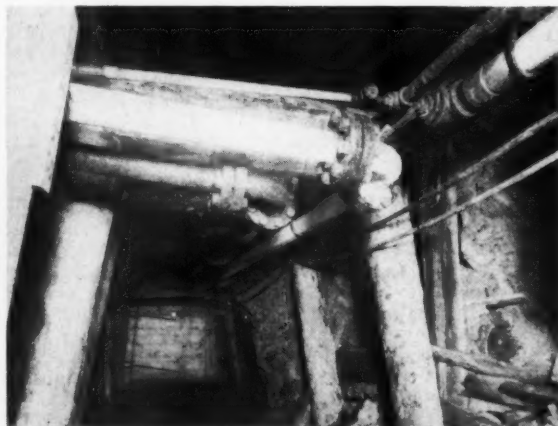
in this first experiment have led to extending climate control to four other workings. An analysis of the annual cost of the cooling plant showed that some expensive items could be eliminated by the introduction of certain features which would be easy to adapt to the final installation. First of all, it was necessary to reduce the power consumption of the cooling plant. Centralization of the cooling plant at the surface produces a considerable improvement in this respect.

The method of re-pumping cooling water from the condenser to the surface, after it has traveled under its own weight from the surface, entails pumping costs comparable with the costs of operating the cooling plant. These costs could be reduced considerably by siphoning the cold water circulating between the central surface plant and the underground exchangers. However, it is not advisable to subject these exchangers or the connecting pipes to a hydrostatic pressure of 100 atmospheres at a depth of 1000 m (3280 ft).

This drawback has been dealt with by installing a pelton wheel in the cold water line which recovers the potential energy accumulated by the water during its descent and restores it, in part, to a pump in the return line. The make-up power necessary to overcome the pressure losses in the circuit and to balance the dissipation of energy in the turbine and in the pump is provided by an electric motor.

Conclusions

The cooling of mine workings constitutes an innovation of which the Belgian mining industry can be proud. Results already obtained after less than three years have been sufficient to cause foreign undertakings to follow in the same path. The satisfaction of having eased the work of the miners is supplemented by the knowledge that output has been increased.



Water is refrigerated at the surface and piped into the mine . . . Or cooled underground near the workings—the heat being carried away by water lines to the surface



1954 Coal Convention

Cincinnati, Ohio, May 3-5

AN outstanding American Mining Congress Coal Convention is slated for Cincinnati May 3-5 at the Netherland Plaza Hotel. Plans for this 1954 meeting, of wide interest to the entire mining industry, are jelling rapidly. All indications point to it as one of the most interesting and constructive meetings that the coal industry has ever held.

Much thought and effort has been going into making coal production more efficient and less costly. This was reflected in the hundreds of suggestions for subjects to be discussed at the convention. From the wealth of material available, the Program Committee selected a well-rounded list of topics covering the majority of coal-mining problems.

Long ago coal mining ceased to be an art and became a science. This science becomes more and more complex as new machines and tools are introduced. There is every indication that this trend is on the rise, and information available at the convention will help many a mine operator solve the problems thus posed. Advances in roof bolting techniques, coal preparation, high voltage cables underground, mine illumination, strip mining and pillar extraction with continuous mining are but a few of the topics which will receive full attention.

Realizing that the larger percentage of coal is still produced with traditional equipment and methods, the Committee has invited speakers to describe the best in present mining practice. Realizing, too, that much can be gained by a look to the future, a considerable part of the program will be devoted to giving the industry a look at things to come in coal utilization, preparation, and mining.

As a change of pace from preoccupation with more technical matters, the social aspect of the convention has likewise received full attention. Two luncheon meetings, at which figures of national prominence will address convention goers, have been scheduled. There will be the justly famous Coal Miners Party and a Baseball Night has once again been arranged. On Wednesday the traditional Annual Banquet will provide a fitting climax

to the American Mining Congress 1954 Coal Convention. A program of top-flight entertainment is being arranged.

Plan now to attend! Hotel reserva-

tions should be made directly with any of Cincinnati's famous hostelrys. Write or wire now, as a record attendance is expected.

Outline of Convention Sessions

MONDAY MORNING, MAY 3

General Session

Opening of Convention
What's Ahead for Coal
The Federal Coal Mine Safety Board
BUSINESS LUNCHEON—Subject to be announced

MONDAY AFTERNOON

Roof Support Session

Rotary Drilling in Sand Rock
Pneumatic Drilling for Roof Bolting
Pillar Extraction Methods and Results

Strip Mining Session

Truck Haulage Problems—Engines, Tires and Roads
Auger Mining in Highwalls
COAL MINERS PARTY—Monday Evening

TUESDAY MORNING, MAY 4

Mechanical Mining Session

Face Preparation in Various Seam Heights
Efficiency of Large vs. Small Crews for Mechanical Mining—A Symposium

Coal Preparation Session

Effects of Future Markets on Preparation
Fine Coal Cleaning—A Symposium on Different Methods and Practices

BUSINESS LUNCHEON—Subject to be announced

TUESDAY AFTERNOON

Haulage Session

Belt Maintenance and Fire Prevention
Shuttle Car Haulage
Extensible Belt Conveyor for Continuous Mining

Strip Mining Session

Greater Yields from Larger Draglines
Overburden Preparation in Anthracite Stripping
Recent Information on Blasting Vibrations

BASEBALL NIGHT—Tuesday Evening

WEDNESDAY MORNING, MAY 5

Maintenance and Power Session

Maintenance for Underground Production
High Voltage Cables Underground
Mine Illumination

Coal Preparation Session

Reject Disposal by Various Means
Utilization and Recovery of Rejects
Eliminating Stream Pollution

WEDNESDAY AFTERNOON

Continuous Mining Session

Operations with the "McKinlay Type" Machines
Continuous Mining in Steeply Pitching Seams
Pillar Extraction with Continuous Mining—A Symposium
ANNUAL BANQUET—Wednesday Evening

World's most mechanized belt-equipped mine uses "U.S." Belts



VIEW OF INBY 42" U. S. GIANT secondary haulage belt discharging onto 48" transfer belt feeding 48" main haulage belt.



48" U. S. GIANT MAIN HAULAGE BELT. The crosswise flexibility of nylon construction enables belt to trough and train properly.

The No. 10 Mine of the Peabody Coal Co., Illinois, has a daily capacity of 12,000 tons. It's one of the most highly mechanized belt-equipped mines in the world.

In the pioneering and design of this great installation, United States Rubber Company engineers played an important part. "U. S." manufactured the main haulage belt, a 48" U. S. Giant® with nylon construction. It has handled peaks as high as 2400 tons per hour with no spillage. "U. S." also made the 48" transfer belt, as well as many of the 36" gathering conveyor belts, plus the two 42" secondary haulage belts. All in all, the total footage of "U. S." belt in this mine is more than 50,000 feet.

This Peabody Mine job is an example of Three-Way Engineering, a "U. S." technique which has proved outstandingly successful on thousands of materials handling jobs, large and small. In Three-way Engineering, "U. S." engineers work hand in hand with the designers of the conveyor system and the engineers of the mine. This is a positive, fool-proof way of obtaining the *right* belt construction for the particular job. Consult any of our 25 District Sales Offices, or write to address below.

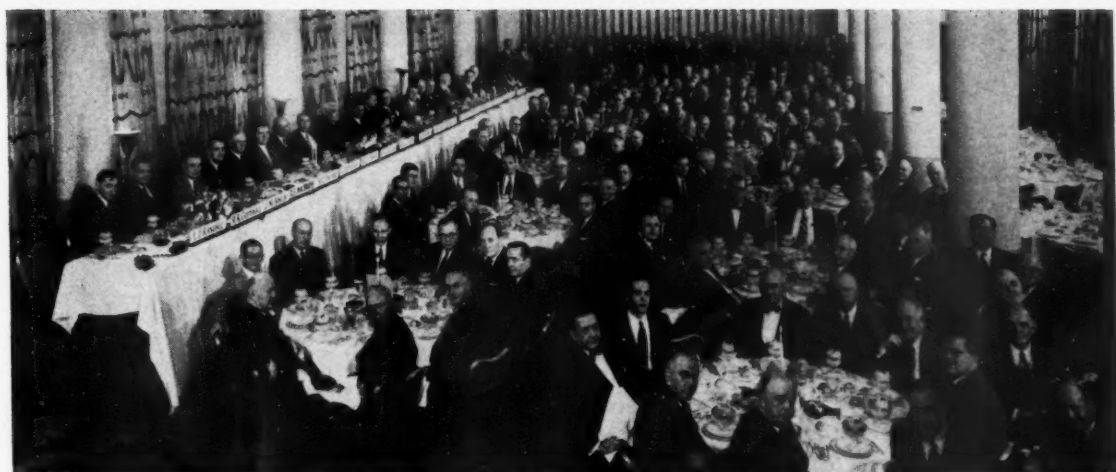


"U.S." Research perfects it
"U.S." Production builds it
U.S. Industry depends on it

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes
Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting



Members from all parts of the country came to the Annual Meeting

AMC Annual Meeting

American Mining Congress Members Gather to Elect Officers, Transact Business

ON December 2 members of the American Mining Congress from every part of the nation convened at New York's Hotel Statler for their annual business meeting. The social hour just before dinner afforded an excellent opportunity for newcomers to meet other members of longer standing and for the renewal of old friendships among those who had attended these meetings before.

Following dinner, President Howard I. Young called the meeting to order and asked for reports from Executive Vice-President Julian Conover and Vice-President Andrew Fletcher, Chairman of the Finance Committee.

In a brief report Conover reviewed the accomplishments of the Mining Congress during the past year and outlined briefly what the country in general, and the mining industry in particular, can expect during the year ahead. He laid emphasis on proposed revisions of the Taft-Hartley Act. He said that in the months ahead special vigilance will be required, not only from mining but from all industry to prevent weakening of the present act and to develop a fair, well balanced labor law.

Subjects for special attention in the field of taxation, he said, will include: definitions of net income and mineral property that affect computation of the depletion allowance; the present disallowance of percentage depletion where a net loss is carried over; removal of limitations on "expensing" of exploration costs; depreciation; and

relief from double taxation of dividends.

He also touched on the plight of the coal, lead-zinc and strategic mineral industries due to heavy imports of competitive products. He stated that the Mining Congress has urged and will continue to urge that the domestic mining industry not be sacrificed in any broad program of international trade.

Among other topics Conover mentioned proposed changes in the mining laws, mine safety legislation, stockpiling, social security taxes and coverage, renegotiation, S.E.C. regulations, land use, water and air pollution, gold and silver legislation, and Government reorganization. He called for continued industry cooperation first in developing and then in supporting the policies needed to preserve a strong domestic mining industry.

Andrew Fletcher presented a financial report summarizing the 1953 income and expense and the outlook for 1954. He pointed out that the strong financial position built up over the past 18 years was maintained during 1953 and predicted that in 1954 overall income and expense would be in balance.

Principal guest speaker for the evening was Secretary of the Interior Douglas McKay, who discussed the activities of his Department and outlined the work being done by the Cabinet Committee which he heads, at the request of President Eisenhower.

McKay told the members that the Committee is determined to come up with recommendations that will clarify national objectives as they affect mining. He stated that the national stockpile policy will be re-examined; that current policies designed to encourage domestic and foreign production, in an emergency, will be scrutinized and that the extent of our dependence on foreign sources for raw materials will be appraised.

While military requirements can be determined with a fair degree of accuracy, he said, information on future peacetime needs is more difficult to come by. By using data compiled by the Paley Commission and several other recent studies, we do not have to start from scratch. We do have a monumental task before us, he said, and need the help of industry to carry out our instructions to preserve and safeguard the economic strength developed by recent expansion of domestic mining.

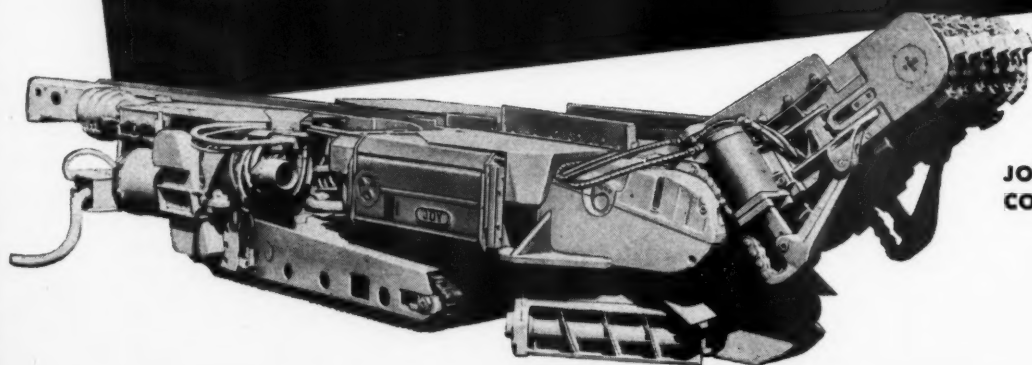
The Secretary expressed the view that the United States is not becoming a "have not" nation from a mineral standpoint, but warned that international trade in minerals is an important part of our foreign policy and must be considered in developing a sound domestic minerals policy. He pointed out that Government-industry cooperation is needed to improve exploration and discovery methods and in research aimed at utilization of lower grade ores.

"A minerals policy," he said, "must be accepted and implemented by producers and consumers—must represent their ideas, their hard work and their desire to maintain the strength of this nation and the prosperity of its people. The Cabinet Committee, with your help seeks the solution."


The Secretary continued in a more
(Continued on page 39)



SCORE: 10 to 1



**JOY 3-JCM
CONTINUOUS MINER**



More than 230 Continuous Miners now on the job or on order

If you're looking for proof of the standout performance and efficiency of Joy Continuous Miners, that comparative score of 10 to 1 is your answer!

What it means is simply this: there are approximately *10 times* as many JCM units now at work or on order as all other makes of comparable mining machines combined. That's *field-proved* superiority . . . not just a comparison on paper. What's more, it's proof from practically every coal-mining area in the world, and covers almost any mining condition you could name. You'll find JCM's in low coal, thick seams and split seams . . . developing entries,

opening headings, driving up rooms and taking pillar. They go anywhere . . . do *every* job well!

Look at it this way: Joy Continuous Miners are the modern way to protect your profit margin. They're fast, tough and flexible . . . built to give you maximum total recovery and high production rates at the lowest possible cost per ton.

● Joy engineers are always at your service. Let us help with *your* production problems, whatever they may be. **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Penna.** In Canada: **Joy Manufacturing Company (Canada) Limited, Galt, Ontario.**

Consult a Joy Engineer



JOY

WORLD'S LARGEST MANUFACTURER OF
UNDERGROUND MINING EQUIPMENT

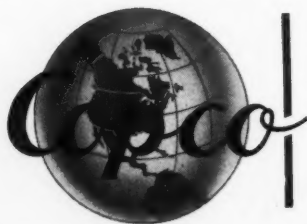
Only performance
counts down here



and only Copco drill steels
are guaranteed

What other drill steel backs its quality with a written guarantee? That's what COPCO gives you! Its justly famous Coromant Steels are 100% warranted against defects . . . even guaranteed against normal operating hazards within reasonable limits! There are numerous other features of COPCO drills that make them the stand-out buy—one piece carbide bit-and-rod construction, chisel shape for better chip clearance, easy jobsite resharping, and so on. See all its advantages for yourself—read the written guarantee . . . watch it in action in your own mine.

Simply drop a card or note to the nearest COPCO office, asking for a demonstration of Coromant Drill Steels next time a field man is in your territory. He will do the rest.



PACIFIC Ltd.

930 Brittan Avenue—San Carlos, Calif.

EASTERN Ltd.

250 Park Avenue—New York 17, N. Y.

MEXICANA S.A.

Ave Juarez y Calle Comonfort
Torreon, Coahuila, Mexico

BRANCH OFFICES AND WAREHOUSES THROUGHOUT NORTH AMERICA

Anthracite's Industrial Markets

C. J. Goodyear, traffic manager of the Philadelphia and Reading Coal and Iron Co., recently told a group in Philadelphia that "Anthracite is not only holding its own in the industrial market, but is developing new uses in industrial applications." Goodyear pointed out that steam sizes in 1952 accounted for 46.1 percent of anthracite's commercial production as compared with 36.2 percent in 1940.

Anthracite is improving its position in a number of industrial markets, also. In the coke industry, Goodyear pointed out, the use of anthracite reduces coking time, increases productive capacity, produces an increase in the amount of coke resulting from a given weight of coal, permits an increase in the amount of coal charged, and results in larger and blockier coke, as well as harder and tougher coke. Anthracite is also assuming more importance in the reduction of zinc ore, in the treatment of phosphate rock and in the lining of the pots in which aluminum oxide is reduced to metallic aluminum.

Goodyear reported that the industry is looking toward another group of new uses, which still lie in the realm of research. They are based on the chemical use of gases that can be extracted from anthracite.

If you
move
materials
in your
business
it will pay
you to
investigate



PRE-ENGINEERED
STANDARDIZED
BELT CONVEYORS

see your B-G distributor
or write

Barber-Greene

AURORA, ILLINOIS, U. S. A.

AMC Annual Meeting

(Continued from page 35)

conversational tone, pointing out how our nation in a comparatively short time has changed from an agrarian to a highly industrial economy. Whatever progress there has been, he attributed to the private enterprise system based on the philosophy that all Americans have the right to work and no work is dishonorable if it is honest. It is up to us to preserve these rights for future generations. We must not look to Government to absorb all the grief of doing business. The free enterprise system carries with it the right to shoulder the losses as well as the opportunity for profit.

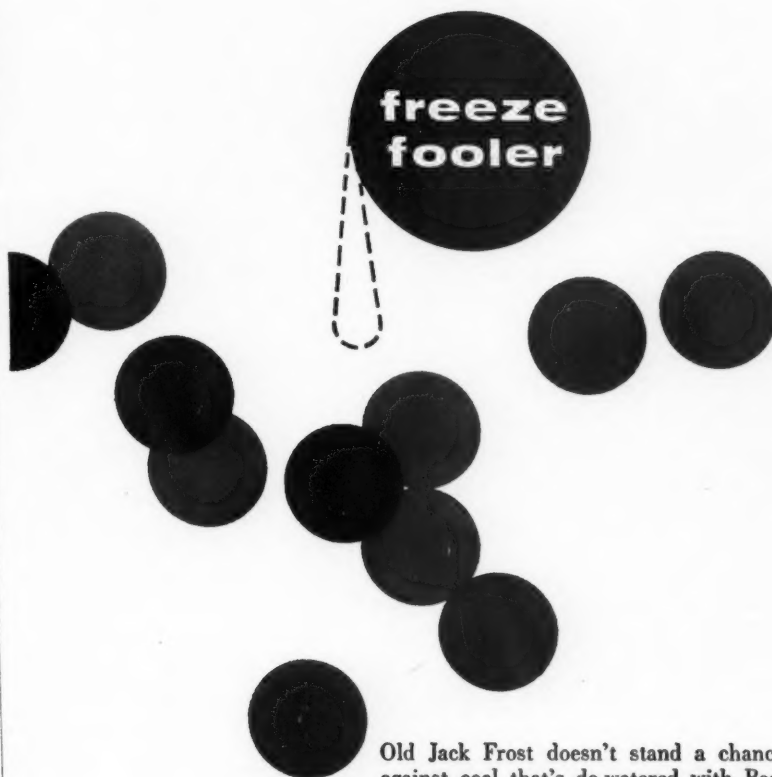
McKay also commended the American Mining Congress on its Declaration of Policy adopted at Seattle and assured the members that the views thus set forth would receive careful consideration.

Assistant Secretary of the Interior Felix E. Wormser supplemented the remarks of his chief. "We are well aware," he said, "that we can never please everyone." He urged industry to cooperate in drafting a policy to keep mining strong. The Cabinet Committee needs industry help and time is short. The Interior Department is maintaining an Open Door Policy. Both Mr. Wormser and Mr. McKay appealed for letters or personal calls from which suggestions for solving the problems of the nation might come.

J. B. Haffner presented the report of the Nominating Committee and the following were unanimously elected to the Board of Directors: For a two-year term, Harrie S. Taylor, president, Oglebay Norton & Co.; for a three-year term, Louis S. Cates, chairman of the Board, Phelps Dodge Corp.; Andrew Fletcher, president, St. Joseph Lead Co.; George B. Harrington, president, Chicago, Wilmington and Franklin Coal Co.; R. A. Hummel, chairman of the Board, Lone Star Cement Co.; Herbert C. Jackson, partner, Pickands Mather & Co.; J. W. Overstreet, president, National Electric Coil Co.; L. J. Randall, president, Hecla Mining Co., and Raymond E. Salvati, president, Island Creek Coal Co.

Following adjournment the Board of Directors met in a nearby room. At this meeting they elected Howard I. Young president for another term; Worthen Bradley, Andrew Fletcher and Raymond E. Salvati, vice-presidents and Julian D. Conover executive vice-president and secretary.

The Executive Committee consisting of Howard I. Young, Louis S. Cates and George B. Harrington was reelected.



Old Jack Frost doesn't stand a chance against coal that's de-watered with Bee-Zee Round Rod Screens. These long-life, extra-efficient screens are unmatched for lowering moisture content. That means you avoid the expense and delay that results when your coal freezes in the cars. It's just another of the many ways Bee-Zee Screens make you money!

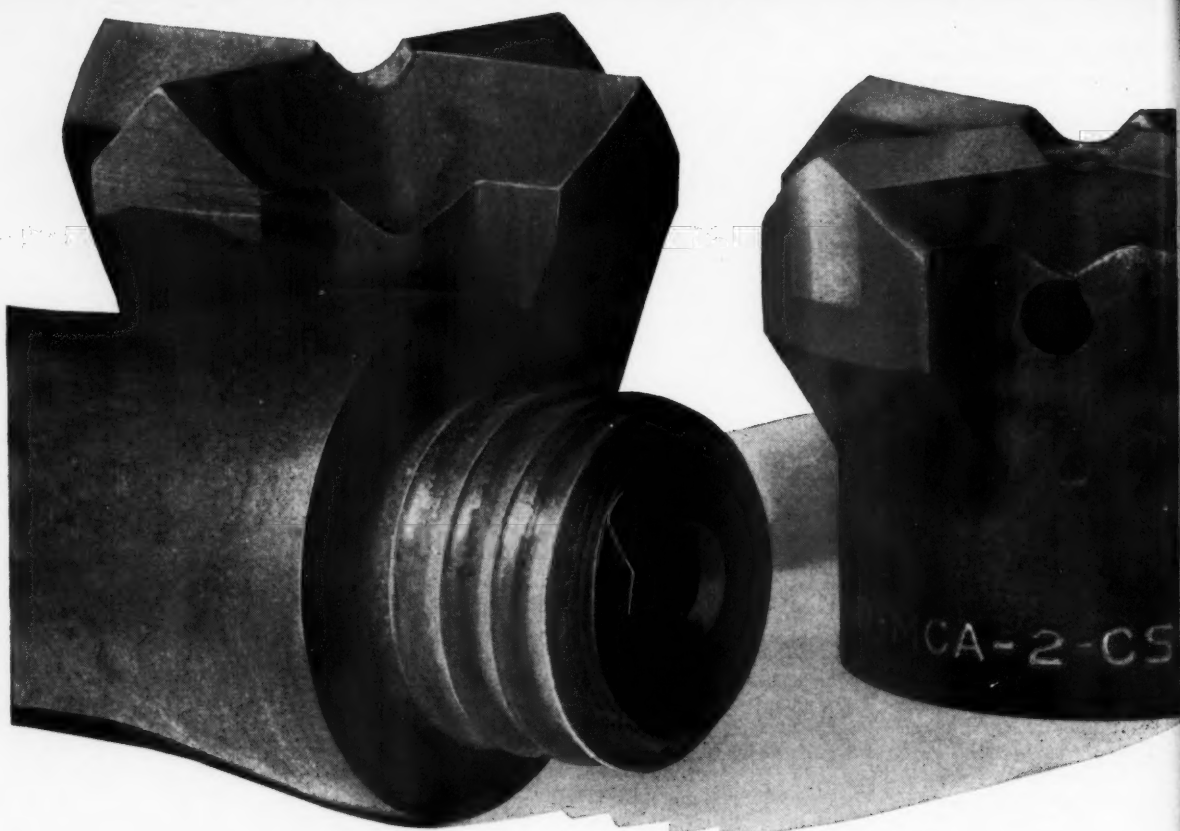
BEE-ZEE EXTRAS — Besides their unequalled efficiency in de-watering, Bee-Zee Screens guarantee extra months of accurate screening . . . less down-time. They can be fitted to any coal processing equipment.



WRITE FOR CATALOG

BIXBY-ZIMMER
Engineering Co.

Abingdon St. Galesburg, Illinois



SWITCH BITS WITHOUT SWITCHING STEELS

DOZENS OF DIFFERENT TIMKEN® ROCK BITS FIT THE SAME DRILL STEEL

With Timken® rock bits, you can quickly change bit types as the ground changes. That's because dozens of different Timken rock bits—both multi-use and carbide insert—fit the same drill steel. When the ground changes, it takes just a minute to screw one type of Timken bit off, screw the other type on.

You don't waste drilling time by going after a different set of drill steels every time a different type of bit is needed.

You can cut your drill steel inventory, too. And you can save even more money because your drillers always can use the most economical bit for the job.

Both Timken multi-use and carbide insert bits give you two additional advantages: 1) they're made from electric furnace Timken fine alloy steel, 2) they have a special shoulder union that keeps the drilling impact from damaging threads.

Get help with your drilling problems from our rock bit engineers. They're experts at cutting costs. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



WHERE TIMKEN MULTI-USE BITS CUT COSTS

Most economical for ordinary ground. With correct and controlled reconditioning they give lowest cost per foot of hole when full increments of steel can be drilled.



WHERE TIMKEN CARBIDE INSERT BITS CUT COSTS

Give highest speed through hard, abrasive ground. Also most economical for constant-gage holes, small-diameter holes, very deep holes.

... your best bet
for the best bit...
for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.



SUPERLA

REG. U. S. PAT. OFF.

Mine Lubricants

One for all...

More and more midwest mines are realizing important savings through the versatility of SUPERLA Mine Lubricants. Inventories have been simplified and over-all lubrication costs reduced.

In one mine, a SUPERLA Mine Lubricant was adopted for use in main transmissions and gathering heads of Joy loaders and in the wheel bearings of coal cars as well. In over three years' operation, there has been no downtime because of scored clutch plates or faulty lubrication. In the cars, leakage of lubricant from bearing housings has been eliminated.

Also in this mine, a SUPERLA Mine Lubricant has provided trouble-free lubrication in the transmissions of Goodman loaders and in the gear cases of cutting machines. In more than three years of operation, there have been no cases of downtime of loaders or cutters due to faulty lubrication. Warm-up time for the loaders has been eliminated.

These are the big jobs, but the versatility of SUPERLA Mine Lubricants covers a wide range of applications from motor armature bearings to loading machine hydraulics. The chances are you can replace several special-

purpose lubricants with one or two SUPERLA Mine Lubricants and get better lubrication results in each case. There's a Standard Oil lubrication specialist located near you who knows mining equipment and who will work closely with you. To reach him, you need only call your local Standard Oil office, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY



(Indiana)



Looking up Stansbury airshaft after sinking was completed

Special Roof Bolt Applications

SPREADING like few other major advancements in the history of mining, roof bolting for roof support has spread from two or three coal mines in 1948 to all branches of the mining industry and has been brought to the surface to stabilize rock cuts along the railroads and highways. Where it will be applied next no one can foresee, but there is an easily visualized application for it in all types of construction work.

The Union Pacific Coal Co., in its mining operations in southwestern Wyoming, has experimented widely with various applications under many different conditions. In almost every case where roof bolts have been used they have improved conditions both from a roof support and a safety standpoint. In most of the installations in the company mines, their use compares with those discussed in many articles and pamphlets. However, there have been several applications that warrant a detailed discussion.

Test Economy of Shaft Supports

Most of the airshafts being used by this company are either concreted for the full depth or have concrete collars and conventional timber, lined with metal lath and plastered for fire resistance. When the No. 1 Seam airshaft for the company's Stansbury mine was in the planning stage it was decided to use roof bolts, wire mesh and gunite in place of conventional

Bolts and Metal Lath Replace Conventional Timber in Unique Shaft Sinking Experiment

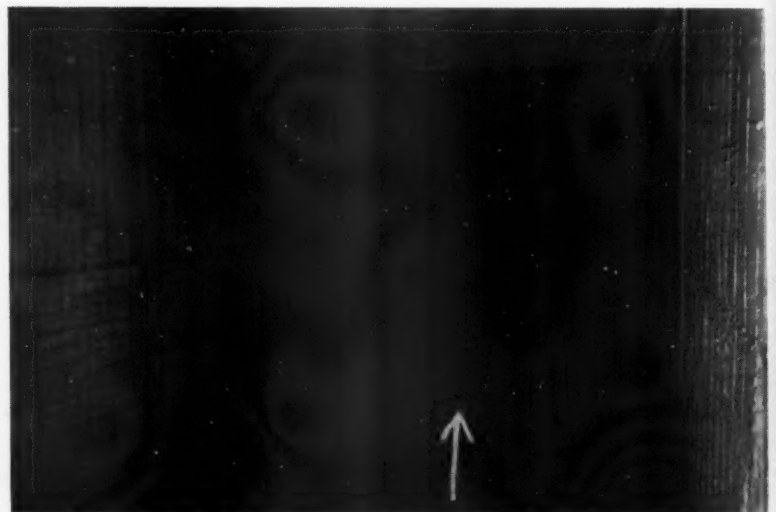
By ROBERT F. BOWIE

Planning Engineer
The Union Pacific Coal Co.

timbering and plaster to determine the economical use of this method of support.

To construct the shaft a 22-in. bore-

hole was first drilled from the surface to the coal seam and a connection driven from the mine workings. A headframe was constructed over the



The lower 37 ft of shaft was concreted. Arrow shows where gunting began

borehole and a small hoist installed. The 11-ft square shaft was sunk by stripping the borehole, dropping the muck to the mine workings below where it was loaded out. Sinking was started on August 27, 1951, and sunk to an initial depth of 32 ft. A concrete collar was poured to this depth and sinking started again, lining with wire mesh and installing one in. diam by three-ft roof bolts. Approximately 43 ft down the shaft carbonaceous shale and burned ground was encountered and continued to a depth of 102.5 ft, through the No. 3 seam which was burned out. The shaft was concreted to this depth.

Below the 102.5-ft depth, lining with wire mesh and bolting was started again, using 58-in. 12½-gauge V-mesh wire, one-in. by six-ft wedge type roof bolts and 8-in. square roof plates. Bolt holes were drilled with jackhammers held up by two men and were placed on 2-ft 10-in. centers horizontally and 2-ft 3-in. centers vertically, offsetting alternate rows. When two rows of bolts were set, a 45-ft length of wire mesh was hung on the bolts, the plates placed and nuts put on and the upper two rows tightened. Nuts on the lower row were left loose, so they could be easily removed for installation of the next ring of wire mesh. The wire mesh was overlapped approximately two in.

Shaft Is Gunited

Bolting in the shaft was continued to a depth of 218.5 ft. A seam of coal encountered at this depth required concreting and the approach concrete was poured up to a depth of 204 ft, leaving a bolted length of 101.5 ft. Total depth of the shaft is 241 ft.

At this time there was some discus-

COMPARISON OF COSTS			
<i>Wire Mesh Lining, Roof Bolting and Guniting</i>			
	<i>Labor</i>	<i>Material</i>	<i>Total</i>
Installing 1" x 6' Roof Bolts	\$13.75	\$14.48	\$28.23
Lining with 58" 12½-gage wire mesh	1.25	2.81	4.06
Guniting (contracted @ \$25.00 per ft. not including material)	25.00	10.00	35.00
Plus 10% Engineering and Contingencies	\$40.00	\$27.29	\$67.29
	4.00	2.73	6.73
TOTAL COST PER FOOT	\$44.00	\$30.02	\$74.02
<i>Concreting</i>			
Reinforcing Rod—½" x 24" O.C.	\$2.50	\$4.69	\$7.19
Forming	7.50	7.50	15.00
Concrete	10.00	25.00	35.00
Strip Forms	5.00		5.00
Plus 10% Engineering and Contingencies	\$25.00	\$37.19	\$62.19
	2.50	3.72	6.22
TOTAL COST PER FOOT	\$27.50	\$40.91	\$68.41
<i>Conventional Timbering</i>			
Timbering (salt treated)	\$6.25	\$28.44	\$34.69
Metal lath	1.25	5.00	6.25
Plaster	2.50	6.25	8.75
Plus 10% Engineering and Contingencies	\$10.00	\$39.69	\$49.69
	1.00	3.97	4.97
TOTAL COST PER FOOT	\$11.00	\$43.66	\$54.66

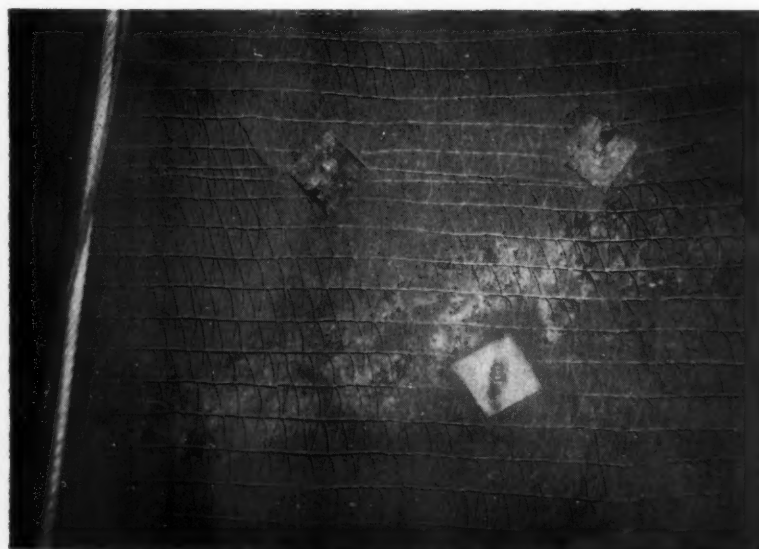
sion of coating the bolts with rust preventive but it was finally decided to gunit the shaft and a contract was let in May, 1952, for this work. Specifications called for a mix of one part Portland cement to 3½ parts screened sand, placed to a minimum total thickness of one in. outside the wire mesh.

A comparison of the cost of installing wire mesh, roof bolting and guniting with the cost of concreting and with the cost of conventional timbering shows that the cost of installing the wire mesh, roof bolting and guniting was appreciably higher than either concreting or conventional timbering. This was due largely to the

high cost of guniting. Even though this cost could be materially reduced by having company forces do the guniting, it could not be reduced enough to compare favorably with conventional timbering. However, if gunite had not been used, and a rust preventative applied to the roof bolts and plates instead, the shaft could have been lined and bolted for a cost of approximately \$40.00 per ft. This would give adequate wall support and would have the additional safety feature of keeping the wire mesh within a few feet of the shaft bottom at all times while sinking a shaft.

Roof Bolting Rock Tunnels

Union Pacific Coal Co. has driven a total of 2000 ft of rock tunnel at various districts during the past year. These have been roof bolted with compressed air powered tools. This method has proved economical from the standpoint of both labor and material. Formerly, rock tunnels were timbered on five-ft centers with 8-in. by 12-in. salt treated timber crossbars set on 8-in. by 8-in. legs; or with 10-in. 23-lb WF beams set on 4-in. 13.8-lb WF legs. Legs were set on concrete footings. In both cases 3-in. by 12-in. lagging was used with a 3-in. by 12-in. railing to protect the legs. Use of roof bolts has made a saving of approximately \$26.57 per ft when compared to costs when using timber sets and \$43.74 per ft when compared to steel sets. In addition the amount of rock to be handled has been cut approximately 12 percent by the reduction in cross sectional area since the space required by the bulkier timber has been eliminated.



To finish the airshaft, the walls could be gunited or the roof bolts and plates coated with rust preventive



New problems were introduced in heat treating of drill steels

THE present work was initiated in an attempt to add one more pertinent paragraph to a much larger and continuing program on the subject of hollow drill steels. The ultimate goal of this program is to improve the existing hollow drill steels, and to develop new and better products for the mining industry.

With the development of the detachable bit and the threaded bit-end attachment, new problems were introduced. One of primary importance was the premature failure of the attachment on the carbon or alloy steel rod. Where carbide insert bits are used, a failure of this type becomes costly. Not only is time lost on the drilling operation, but there is also the possibility of serious damage to a valuable bit.

Typical failures of the threaded attachment generally occur through the threads, or on the fillet between the shoulder of the rod and the threaded portion. There are a number of reasons for failures of this type. Some of these are noted below, but not necessarily in the order of importance.

(A) Insufficient radius of the fillet, rough machining or absence of prestressing.

(B) Excessive notch sensitivity of the steel used.

(C) Eccentric loading due to incorrect alignment of the threaded attachment with the longitudinal axis of the rod.

(D) Improper seating of the threaded portion in the bit, or the bit on the shoulder of the rod.

(E) Excessive scaling of the threaded section during subsequent thermal treatments.

It is this latter condition which is

Hollow Drill Steels

Some Observations on the Scaling Rate at Various Times and Temperatures

By W. W. DURAND

Laboratory Supervisor
Park Works, Crucible Steel Company of America

of principal concern in the present study. The results of excessive scaling may be undersize threads, loose fitting bits and ultimate mechanical failure from unfavorable stress distribution.

The Problems Stated

Therefore, questions which readily come to mind are: What is the rate of oxidation in some of the drill steels used today? What temperature is critical for certain analyses? What precautionary measures should be taken to modify the tendency to scale?

In view of the importance of these and other questions to the proper fabrication of attachment end rods, it seemed warranted to investigate briefly the scaling characteristics of three drill steel analyses.

As in any study of this type, it was first necessary to establish a standard test piece. Representative billet stock was forged to one inch round and then normalized. For convenience and re-

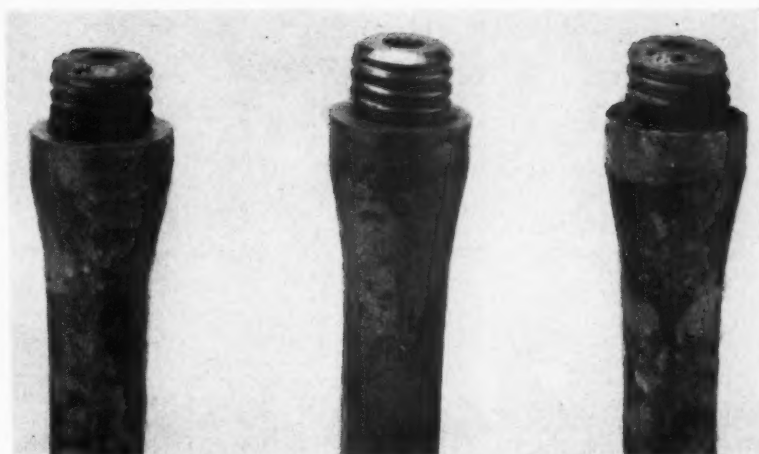
producibility, samples, measuring 2½ in. long and ¾ in. in diameter were machined from the forged and normalized bar. After machining, the test samples were polished through 00 emery paper.

All heating was conducted in a natural gas—air fired semi-muffle furnace with manometer control. The heating chamber dimensions were 50 in. deep, 35 in. wide and 23 in. high. Continuous combustion control was maintained at all times with a Cities Service Industrial Heat Prover. Periodic checks were also made with the traditional Orsat chemical absorption process. Furnace as well as test sample temperatures were recorded separately on individual L & N potentiometers. Platinum vs. platinum + 10 percent rhodium thermocouples were utilized.

Although furnace operation with a slightly smoky flame is recommended when heating for drill rod fabrication, several of the field installations checked were definitely operating with

an oxidizing atmosphere. Therefore to emphasize the undesirability of such a condition, an atmosphere of seven to eight percent excess oxygen, 7.5 percent carbon dioxide and zero percent carbon monoxide was used in this work.

It was decided to determine first the time required to heat the standard test sample to various temperatures under the furnace conditions noted above. To do this, a thermocouple was inserted to the cross-sectional center of the test sample and sealed. This assembly was then placed in a small cylindrical wire basket made of Rezistal Stainless steel, and suspended half-way between the roof and hearth of the heating chamber. Directly adjacent to the wire basket was another thermocouple for recording the furnace temperature, and two porcelain sampling tubes connected to the atmosphere control apparatus. The results of these determinations are plotted in Fig. 2. This curve, for example, indicates that the standard test specimen ($\frac{3}{8}$ -in. Rd. x $2\frac{1}{2}$ in. long) required approximately 22 minutes and 15 seconds to reach 1400° F from room temperature. Likewise, under similar conditions, a duplicate



Excessive scaling of threaded sections can result in ultimate mechanical failure

sample required only 5 minutes to attain a temperature of 2000° F.

Essentially the same method as above was used for studying the scaling characteristics, except that the test sample was solid with no thermocouple inserted. The specimens were held at the respective times and temperatures shown in the plots of Fig. 3, 4, and 5. They were then re-

moved from the furnace, air cooled, descaled in a sodium hydride bath, washed, dried and weighed. The difference between the original and final weight of the standard specimen (or loss in weight method to the nearest one-hundredth of a gram) was used to collect the data which is graphically presented in Fig. 3 to 5 inclusive. Within the scope of this investiga-

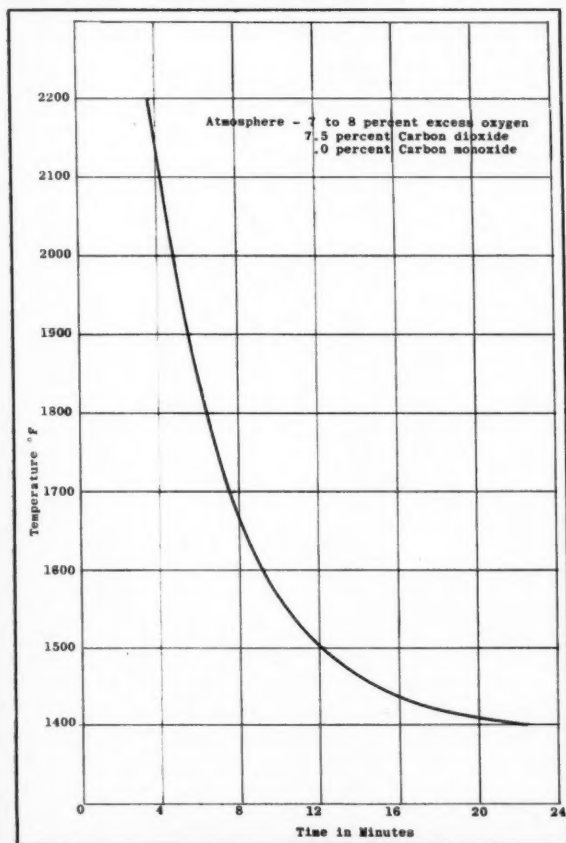


Fig. 2—Time required for a $\frac{3}{8}$ " Rd. x $2\frac{1}{2}$ " long specimen to reach temperature at the cross-sectional center

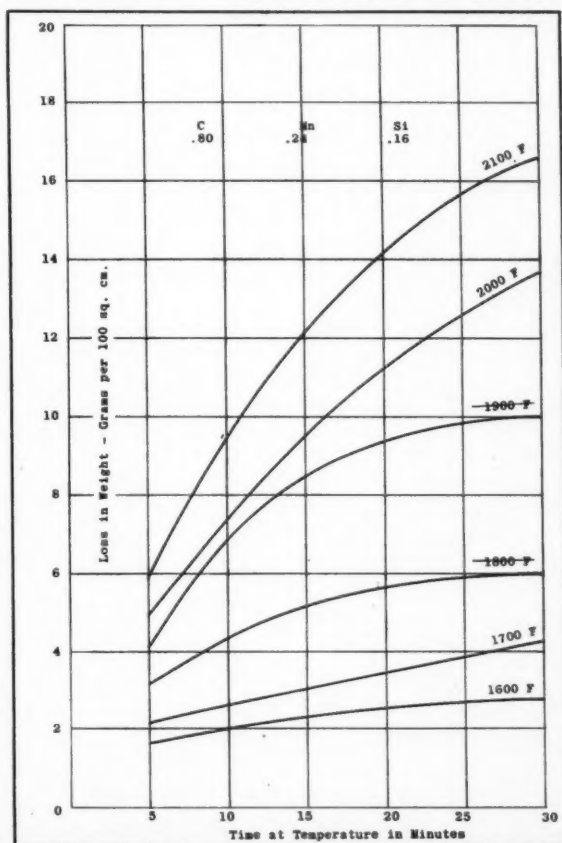


Fig. 3—Steel A. Effect of variation in time on the scaling loss at the temperature noted

tion, the three groups of curves permit the following conclusions:

(1) In all instances, the amount of scaling increases with an increase in time at temperature.

(2) Likewise, with time constant, the amount of scaling increases with an increase in temperature.

(3) The rate of scaling increases noticeably at the higher temperatures. But the temperature at which this increased rate begins, seems to be dependent on the steel involved. As can be seen from the curves, it is above 1800° F for Steel A, above 1900° F for Steel B and above 2000° F for Steel C.

In other words, Steel A was more susceptible to scaling between 1600° F and 2100° F than either Steels B or C.

(4) A difference in scale characteristics was also evident between the three analyses. The most noticeable contrast existed between Steels B and C. The former presented a tight adherent scale, while that of the latter could be removed as a complete shell or envelope.

The obvious requirement of a standard test sample in this type of work made it highly improbable that the scale loss derived here could be easily applied to the surface area of a threaded attachment. Nor was it the intention to do so. If anything, a thread design would present a more hazardous contour to oxidation than the solid cylindrical specimen used to collect these data.

It is therefore obvious that certain precautionary measures must be strictly adhered to, if we are to prevent excessive scaling during the thermal treatment of the attachment end. Of primary importance, is the time and temperature which the heat treaters select for the job. These should be the minimum at which a metallurgically consistent product is attained. Time and temperature will, of course, vary somewhat with the composition of the steel involved, and with the dimensions of the part treated. However, any flagrant disregard of either will certainly result in a harmful scale formation.

Thread wear can also be induced by the abrasive action of scale. Thus, even after proper heat treatment with normal scale formation, the scale should be removed from the threaded attachment. Wire brushing is a safe and effective method for doing this, and will not injure the thread form.

Another feature of considerable importance during heat treatment is the furnace atmosphere. The heating equipment should at no time be operated with a highly oxidizing flame. The higher the excess oxygen content, the greater is the tendency for scale and decarburization to form. It is recommended that the furnace operate with a "soft" smoky flame or under near neutral conditions. Similar recommendations are given in detail by the Ingersoll-Rand Co. in their fabricating instructions for jackrods Nos. PS-5650.19.

Therefore, good furnace practice and a few reasonable precautions are the main requisites for the elimination of excessive scale and its undesirable effects on the attachment end.

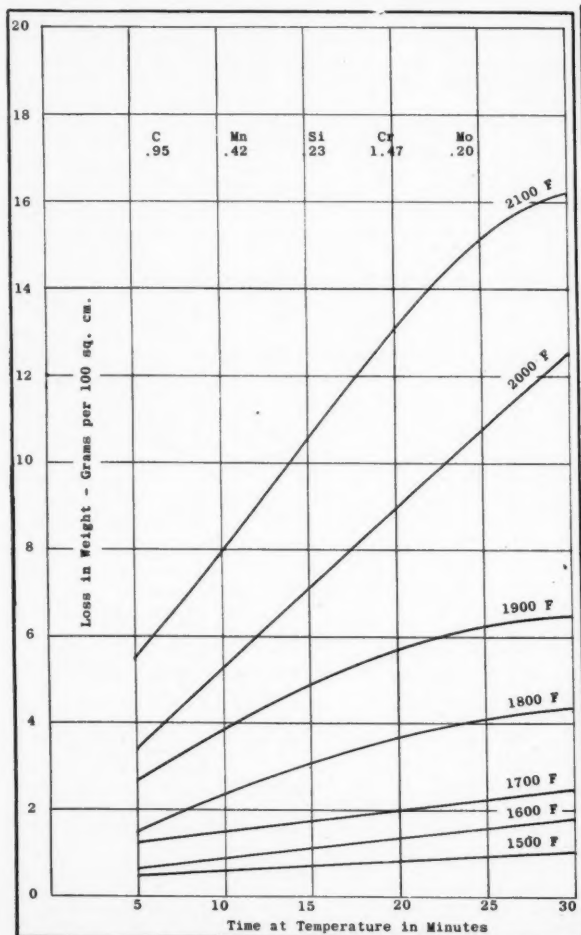


Fig. 4—Steel B. Effect of variation in time on the scaling loss at the temperatures noted

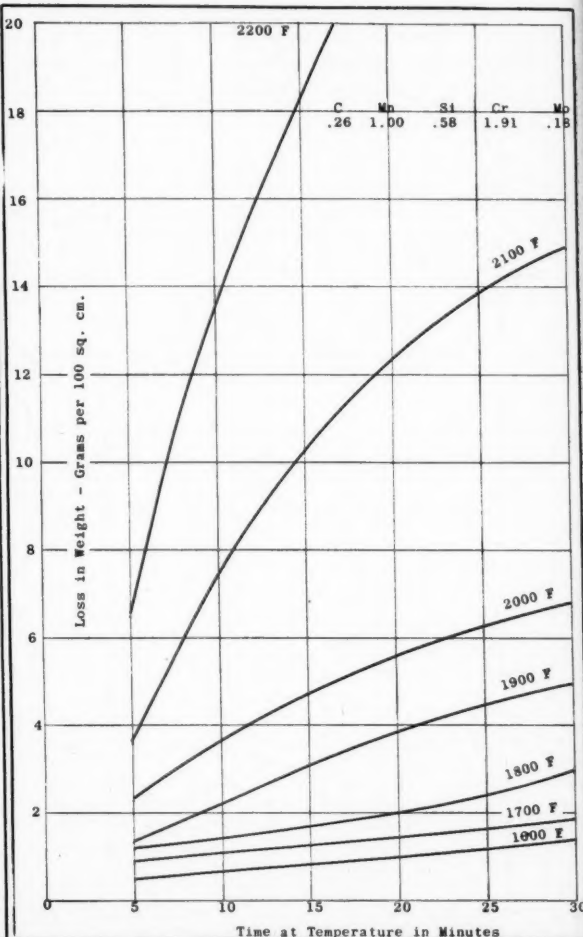


Fig. 5—Steel C. Effect of variation in time on the scaling loss at the temperatures noted

Why you should use Du Pont Iron Wire Caps

- ✓ They're more economical than copper wires.
- ✓ White plastic insulation is easier to see in coal.
- ✓ Exclusive safety features: rubber plug closures, shielded shunts.
- ✓ Wires may be removed from coal by magnetic separators.
- ✓ Available in nine standard lengths ranging from four to twenty feet.

E. I. DU PONT DE NEMOURS & CO. (INC.)

EXPLOSIVES DEPARTMENT

WILMINGTON 98, DELAWARE



DU PONT EXPLOSIVES

Blasting Supplies and Accessories



BETTER THINGS FOR BETTER LIVING
THROUGH CHEMISTRY



In processing plant at Monticello, Utah, uranium ore is treated by carbonate process

Methods of Processing Uranium Ores

Plant Design Depends on Ore to Be Treated But Basic Steps are Similar

By S. J. SWAINSON

Director Mineral Dressing Laboratories
American Cyanamid Co.

IN THE base metal and nonmetallic mineral fields, concentration and extractive metallurgical methods are used to win metals from their ores. Gravity concentration and flotation processes are probably the two best examples of the former. Leaching and hydrometallurgical processes are the best illustrations of the latter.

Black oxides of uranium, uraninite and pitchblende, because of their high specific gravity, are generally amenable to gravity concentration. Tumbling, jigging and spiralling can successfully be used to concentrate higher grade pitchblende ores. Our domestic primary ore deposits, however, are of a much lower grade. The black oxides in these deposits are usually too finely disseminated to be liberated except by extremely fine grinding. The great variety of secondary minerals are of too low a specific gravity to be concentrated in this manner.

Unfortunately, uranium does not occur as a sulfide and, consequently, cannot be recovered by sulfide flotation. We do find some sulfide ores containing the black oxides of uranium but usually the uranium minerals are finely disseminated throughout the sulfides and, although nice two and three metal selective floats can be obtained on the sulfides, the ubiquitous uranium appears in all products.

Much research work is being done in the laboratories on utilizing non-metallic flotation procedures for floating the secondary uranium minerals. One can visualize the obstacles, however, when it is realized that there are scores of these minerals, many of which appear in one ore body and may be vanadates, carbonates, phosphates, silicates, sulfates or as complex combinations of these anions.

Most of these secondary minerals occur as coatings on sand grains or as interstitial filling in sandstones. As a majority of these minerals are soft, they can be concentrated somewhat by attrition methods. Both dry and wet scrubbing processes have been used successfully in the laboratory but, to date, no commercial plant is making this type of concentration.

Most uranium minerals are readily dissolved in the mineral acids and in hot alkali carbonate solutions, and it may be said that, at this time at least, the domestic uranium ores are more amenable to hydrometallurgical methods than to mineral dressing processes. In fact, except for the lixiviant used, the processing of uranium ores is

very similar to the hydrometallurgical methods used in leaching copper, silver and gold. The flowsheets of uranium plants are very similar to those used in cyaniding gold and silver ores. Standard milling equipment is used through most plants, and the crushing, grinding and classification are orthodox.

There are, in general, two main and basic processes for leaching uranium bearing ores. Each process has its own advantages and disadvantages. Each has its own advocates and critics. Ore types to be treated are usually the deciding factor in determining which process will be used. These two main schemes of treatment are the carbonate leach and the acid leach.

Carbonate Process

As a general rule, more ore types are refractory to standard carbonate leach practice than to the acid leach process and ores amenable to both types of treatment will usually surrender more of their value to the acid treatment.

The carbonate process, however, has its advantages. The capital cost of the plant itself is lower than that of a plant designed for acid. High grade

precipitates, containing few impurities, can be recovered from pregnant carbonate solutions very readily. Costs, obtained by employing newer precipitation methods, are usually less for the carbonate system of leaching.

Limestone ores and ores containing large amounts of calcium carbonate are better treated by this method because of the prohibitive amounts of acid required when using the acid leaching technique.

One of the most common practices used is that of salt roasting prior to leaching. This process is used on low lime ores (usually less than two percent CaO) containing an appreciable amount of vanadium. The ore, reduced to 10-14 mesh, is intimately mixed with salt and fed to a multiple hearth roaster. The usual quantity of salt addition is in the range of six to nine percent of the ore weight and is added, primarily for the available sodium. This sodium combines with the vanadium to form a water soluble sodium vanadate which is extracted in the subsequent leaching operations.

Temperature and time of contact through the roaster is especially important when using carbonate leach. Too high a temperature will slag the charge and will insolubilize part of the uranium and vanadium. The conversion of the uranium and vanadium to soluble compounds is incomplete at too low a temperature. A contact time of 90 min at a charged temperature of 850° C appears to be optimum for most ores of this type. High lime ores cannot successfully be treated by the salt roaster procedure without pretreatment because of the formation

of the insoluble calcium vanadate during the roast.

The calcines in this roasting step are immediately quenched with hot carbonate solutions. This immediate quenching is very necessary, as both the uranium and vanadium recoveries fall off rapidly if the calcines are allowed to cool prior to quenching. The subsequent procedures used vary from plant to plant using this type of leach.

The Monticello (Utah) plant grinds these quenched calcines to approximately grain size (48-65 mesh) before sending them to steam heated agitators. The pulps are then transferred to a series of thickeners for CCD washing. The overflow from the last thickener is clarified and stored for precipitation.

Other plants merely take the quenched calcines and batch leach them by percolation with hot soda ash solutions in filter bottom tanks. The sands are washed with hot water until the underflow reaches the desired cut-off value strength. Pregnant solutions are clarified and stored for precipitation.

Most low vanadium ores, both of the high lime and low lime types, and also the asphaltic Temple Mountain ores, are amenable to direct leaching by carbonate solutions. These leached pulps, however, are very difficult to thicken and filter. Baking these ores at 500° C for approximately two hours in an oxidizing atmosphere will eliminate the carbonaceous material and dehydrate the clays. Some sacrifice of uranium is experienced from this baking procedure but the resulting pulps settle and filter well.

Another type of ore amenable to the carbonate leach system is the high limestone ore found in the Grants (N. M.) district. The Anaconda Copper Mining Co. has just completed a mill to treat these ores which contain up to 90 percent CaCO₃. As these ores contain very little vanadium and a minimum of clay material, they do not have to be either baked at 500° C or subjected to the high temperature salt roast. They settle fairly well even after being given a fine grind. These are probably the simplest ores to treat, metallurgically, found in the region but it took months of intensified and diligent research work to develop the flow sheet. A fine grind followed by a hot, five percent, carbonate-bicarbonate leach appears to extract values satisfactorily. The pulp is then filtered, washed for value recovery and the solution clarified and stored for precipitation. Careful mining will be necessary at this property as any gypsum present in the ore will react with the sodium carbonate solutions and will increase the soda ash consumption appreciably.

Pregnant solutions, gained from all of the carbonate techniques just described, can be subjected to several methods of precipitation. Some of these procedures are classified and will not be discussed here.

When the pH of these pregnant solutions is reduced to about six, with sulfuric acid, uranium is precipitated as a "yellow cake" (sodium uranyl vanadate). This yellow precipitate is separated from the mother liquor by filtration and dried. The filtrate goes on to the vanadium precipitating section. The dried yellow cake is fused with soda ash, salt and sawdust and the melt from this reducing fusion is cast into molds where it solidifies. This cake is then broken up and is hot water leached in agitators.

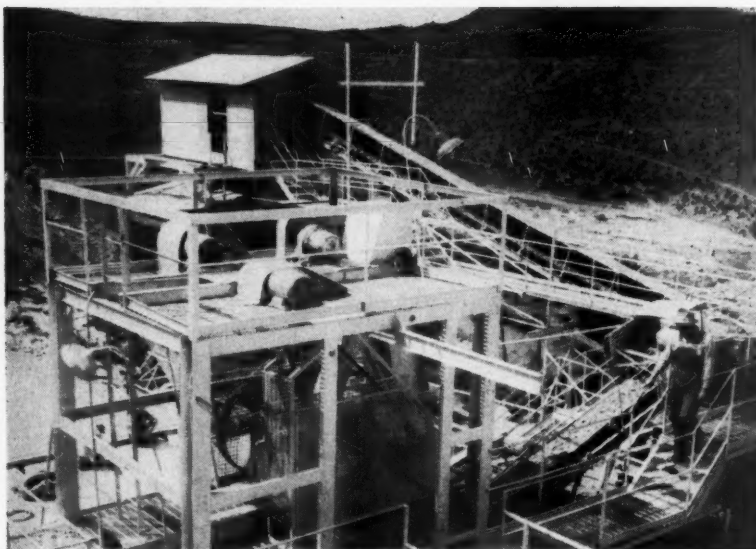
The vanadium in this fused cake is readily water soluble while the black oxides of the uranium are insoluble and are separated from the vanadium bearing solutions by decantation and washing. They are subsequently filtered, washed, dried and packaged as finished products.

Sodium chlorate is added to the vanadium solutions, derived from the uranium precipitation and purification sections, to completely oxidize the vanadium to the pentavalent state, and sulfuric acid is added to obtain a pH of 2-3. The liquor is heated to approximately 80° C and the final pH adjusted, by the addition of either an acid or base, to obtain a precipitate called "red cake" of the proper physical property. This precipitate of red cake (sodium acid vanadate) is then fused to the black oxide which is considered final product.

Another method of recovering uranium values from carbonate solutions, low in vanadium, is by using sodium



Ore is trucked from many small mines to centrally located mills



Each batch of ore received at the mill is carefully sampled

hydroxide as a precipitant. When caustic soda is added, in excess, to a carbonate solution containing sodium uranyl triacarbonate ($\text{Na}_4/\text{UO}_2(\text{CO}_3)_3$), the usual form of the dissolved uranium, a precipitate of sodium diuranate ($\text{Na}_2\text{U}_2\text{O}_7$) is formed. This precipitate is filtered, washed, dried and packaged as final product. The excess caustic soda in the filtrate is regenerated to sodium carbonate by CO_2 or by sodium bicarbonate and reused.

Acid Plants

As mentioned before, this process has its advantages and disadvantages. Capital costs are high, and the strong acid solutions dissolve many impurities along with the desired uranium. During the precipitation and purification steps, these impurities are difficult to eliminate from the desired

product. Several new methods of recovering values from these solutions have been developed and appear to have eliminated this undesirable feature from the acid leach. Roasting conditions and quench manipulations are not so critical as when using the carbonate leach.

The big advantage of the acid leach procedure, however, is its ability to obtain higher recoveries on most ores.

Most of the existing plants are really converted vanadium plants adapted to recovery of uranium. They follow the traditional vanadium flow-sheet but have an auxiliary section designed to recover uranium.

This traditional method calls for a salt roast quite similar to that described for the carbonate procedure. The calcines are water leached, filtered and washed. The vanadium rich

filtrate goes to precipitation where "red cake" is produced by the addition of sulfuric acid. This step is also quite similar to the vanadium precipitation procedure described under the carbonate leaches and follows through with similar filtering, washing and fusion to form the black oxide. Vanadium recovery from this water leach is about 65 to 75 percent of the total vanadium.

The filtered vanadium leached calcines are acid leached at a low pH to recover the uranium. The uranium is recovered from solution by a complicated process in which the solutions are taken past neutral several times by alternate additions of acids and bases. This acid leach usually recovers from 85 to 90 percent of the contained uranium and an additional 10 to 15 percent of the vanadium.

Each plant has its own refinements and techniques throughout all of these steps, but the basic steps are virtually the same. One plant makes a sand-slime separation prior to salt roasting the slimes for vanadium recovery, by water leach, with a subsequent acid leach for uranium. The sands are merely acid leached for uranium and in this manner, the tonnage through the roaster is cut appreciably. Another plant, treating ores with little or no vanadium, does not salt roast or water leach. They do, however, subject their crushed ore to a 500° C bake prior to leaching. This dehydration step enhances the settling and filtering rates of the pulp throughout the plant. Still another plant obtains good settling and filtering without either roasting or baking.

So one can see, from the above brief discussion that, in this uranium processing business, just as in most every other phase of the nonferrous metal extraction industry, the design of the plant is dependent upon the ore to be treated.

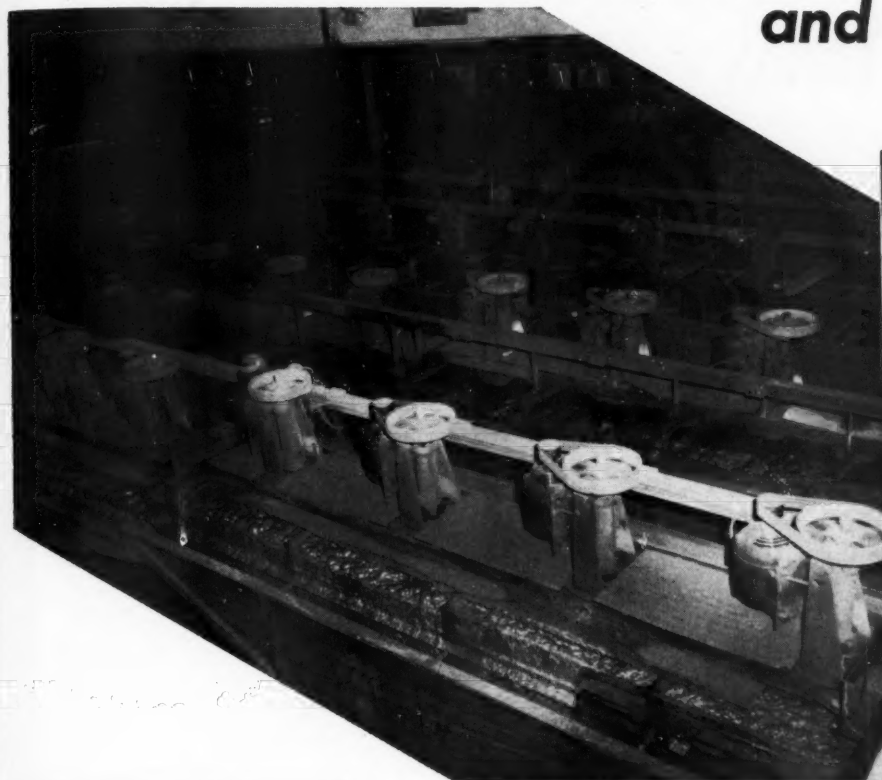


"Yellow Cake" (sodium uranyl vanadate) is precipitated from solution and filtered out



"Red cake" (sodium acid vanadate) is precipitated from the filtrate

FAGERGRENS pay off in both ROUGHER and CLEANER Flotation



Fagergren cells in lead cleaner flotation circuit.



Fagergren cells in zinc cleaner flotation circuit.

HERE ARE THE RESULTS OBTAINED BY A MAJOR LEAD-ZINC PRODUCER

Fagergrens used for rougher flotation by Pend Oreille Mines & Metals Co., Metalline Falls, Wash. Zinc circuit in foreground, lead circuit in center; duplicate circuits being installed in background.

48 Fagergren Flotation Machines are used by Pend Oreille Mines & Metals Co. in flotation circuits having a capacity of 1600 tons per day. The ore is hard and abrasive with lead (as galena) occurring in coarse crystals and zinc (as sphalerite) finely disseminated in the gangue. Specific gravity of ore is 2.7 to 2.8.

Fagergren's highly efficient performance in this application produces superior metallurgical results, as follows:

1. Lead concentrate grade averaging well over 70% lead.
2. Zinc concentrate grade running close to 60% zinc.
3. Recoveries of approximately 95% lead and zinc in respective concentrates.
4. Exceptionally low lead and zinc tailing assays.

High Metallurgical Efficiency, as demonstrated above, is not unusual with Fagergrens. It is based on the faster rate of flotation and greater flotation recovery made possible by Fagergren's exclusive Rotor-Stator design. This superior agitating mechanism is unmatched for effective pulp circulation and aeration with resulting greater capacity per cubic foot of cell volume and higher mineral recovery.

Specify Fagergrens for your next installation or as replacements for older, less efficient machines. Send today for free copy of Fagergren descriptive bulletin and for recommendations concerning your flotation problem.

PRINCIPAL OFFICES

San Francisco • Sacramento
Salt Lake City • Spokane
Denver • Phoenix
Chicago • Hibbing, Minnesota
New York • Birmingham
Toronto, Canada
Jeffersonville, Indiana

EXPORT DISTRIBUTORS

Fraser & Chalmers (S.A.) (Pty.) Limited
P. O. Box 619, Johannesburg, South Africa
Lilstone & Co., Inc.
P. O. Box 3368, Manila, Philippines
United Development Corporation Pty. Ltd.
P. O. Box 3460, Sydney, N.S.W., Australia
Corporation Commercial Sudamericana S.A.
Caillie 505, Lima, Peru
The Sumitomo Machinery Co., Ltd.
5-22 Kitahama, Higashi-Ku, Osaka, Japan

WEMCO

WESTERN MACHINERY COMPANY

760-766 FOLSOM STREET • SAN FRANCISCO 7, CALIFORNIA

Mobil-Mills • Coal Spirals • HMS Thickeners • HMS Pumps • Sand Pumps • Agitators
Cone Separators • Drum Separators • Hydroseparators • Fagergren Laboratory Units
Fagergren & Steffensen Flotation Machines • S-H Classifiers • Attrition Machines
HMS Laboratory Units • Dewatering Spirals • Thickeners • Conditioners • Densifiers

Preliminary Report on Standards For Heavy Rail Turnouts

FIRST standards for frogs, switches and turnouts for coal mine track were formulated by the American Mining Congress, Coal Division, Committee on Mine Haulage Roads and accepted by the American Standards Association in 1934. These specifications have been adopted by manufacturers of frogs, switches and other track accessories so that today the parts of mine track turnouts have standard dimensions and are interchangeable. Present standards cover only up to 80-lb rail. The trend toward heavier mine equipment, large capacity cars and high speed trips, indicates a need for heavier track construction.

Anticipating this trend, a study on standards for 85, 90 and 100-lb turnouts has been made by a subcommittee of rail manufacturers and mine operators, all thoroughly conversant with the design and operation of track haulage systems.

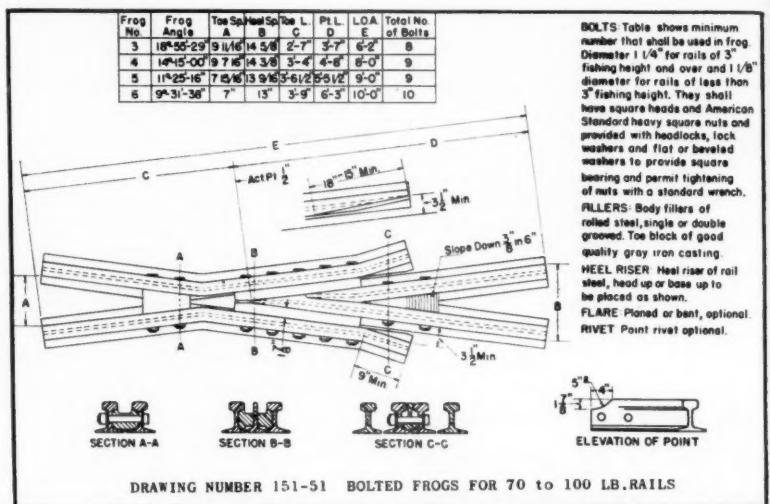
Four drawings showing frogs and switches for 70 to 100-lb rail have been completed and are presented here. These have been approved by the Committee on Mine Haulage Roads and are now submitted to the coal industry as a tentative proposal. Comment is invited from mine operators, track manufacturers and makers of mine cars and locomotives.

Tentative Specifications Submitted by the Subcommittee for Approval or Comment from the Industry

J. E. ELKIN, J. B. HASKELL, C. F. MEYER and E. E. ROECHER

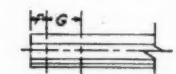
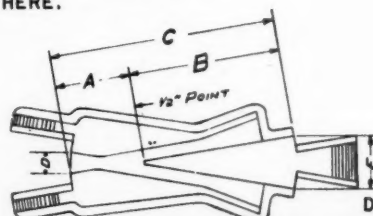
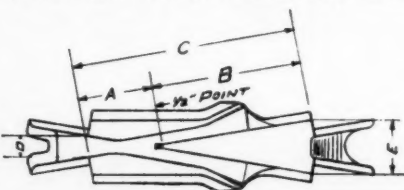
If no objections are offered, the new specifications will be included in the next publication by the American

Mining Congress of the booklet, "Construction and Maintenance of Main Haulage Roads in Coal Mines."



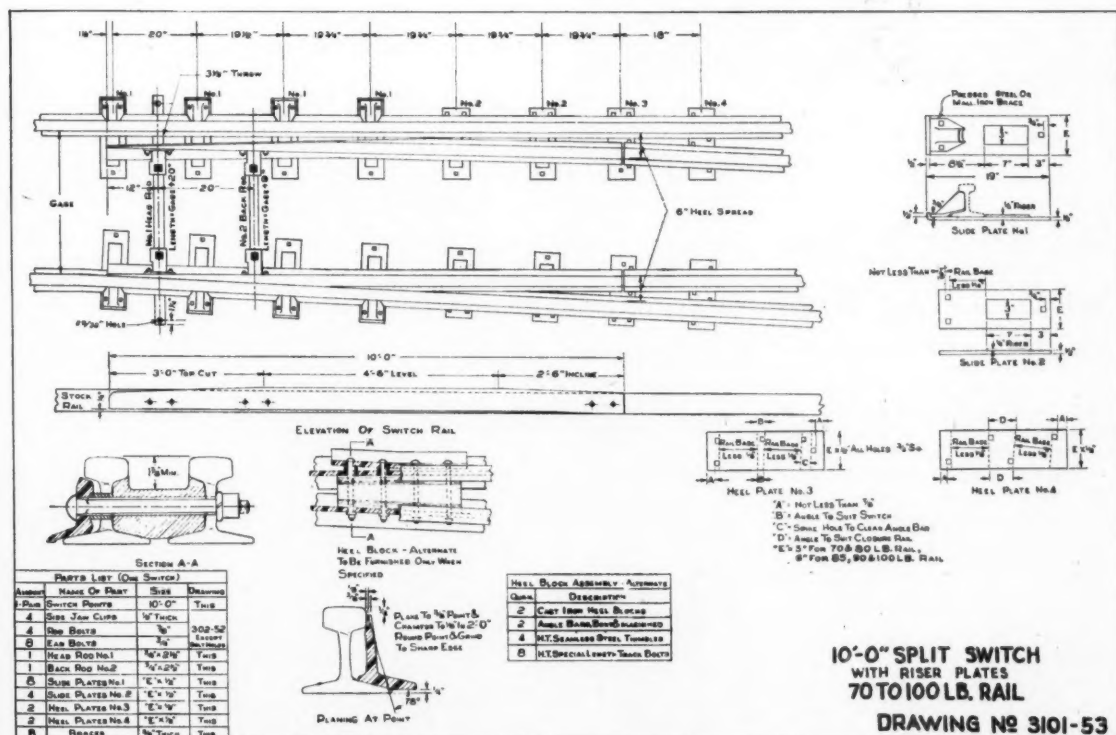
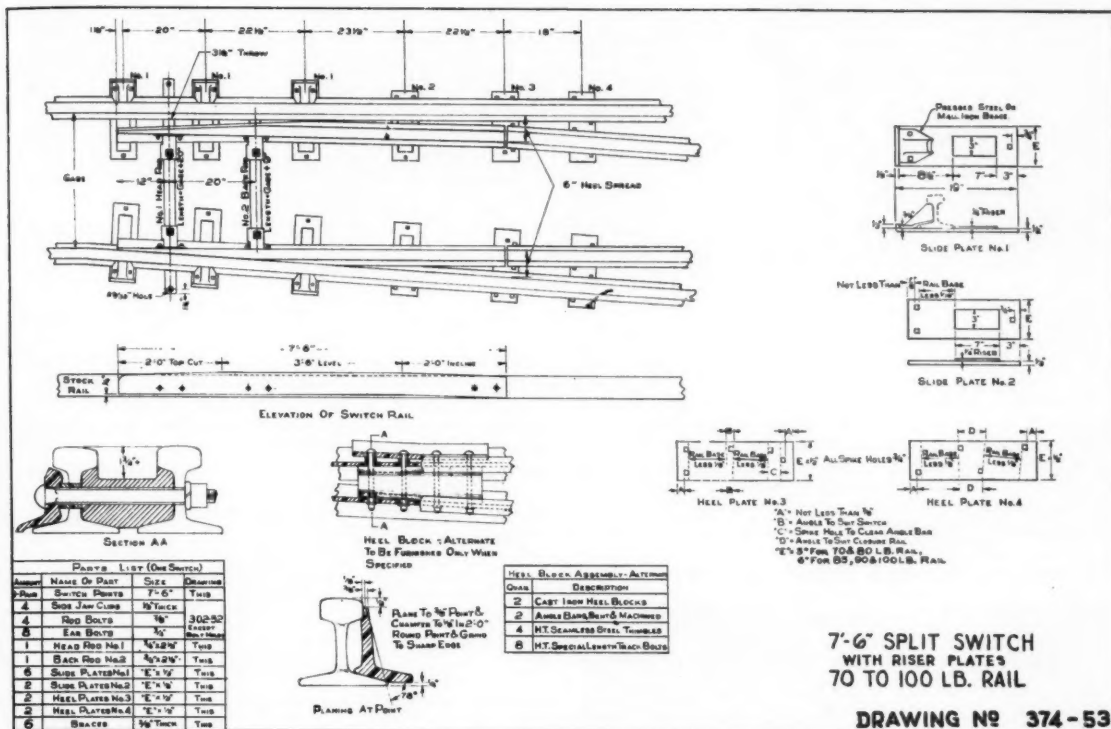
RAIL	70 lb.			80 lb.			85 lb.			90 lb.			100 lb.		
D	2 3/8"			2 3/8"			3 1/8"			3 1/8"			3 3/8"		
E	7 1/4"			7 3/8"			7 7/8"			8 1/8"			8 5/8"		
FROG	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
3	9 1/2"	20 3/16"	30 1/16"	9 1/2"	21 1/16"	31 3/16"	11"	22 7/16"	33 7/16"	11"	23 3/16"	34 3/16"	11"	24 3/4"	35 3/4"
4	12 3/8"	27 1/4"	39 1/8"	12 3/8"	28 3/4"	41 5/8"	14 5/8"	29 3/4"	44 3/8"	14 5/8"	30 3/4"	45 3/8"	14 5/8"	32 3/4"	47 3/8"
5	15 1/16"	33 1/8"	49 3/8"	15 1/16"	35 1/8"	51 1/2"	18 3/16"	37 1/16"	55 1/4"	18 3/16"	38 5/16"	56 1/2"	18 3/16"	40 1/4"	59"
6	18 13/16"	40 1/16"	59 1/2"	18 13/16"	42 1/8"	61 3/4"	21 13/16"	44 7/16"	66 1/4"	21 13/16"	45 15/16"	67 3/4"	21 13/16"	48 15/16"	70 3/4"

TWO STYLES OF FROGS ARE SHOWN BUT THE SELECTION OF ANY DESIGN RESTS WITH THE USER. THE AMC RECOMMENDATIONS APPLY ONLY TO THE DEMENSIONS GIVEN HERE.



BOLT SPACING FOR
SPLICE BARS

DRAWING NUMBER 202-52
CAST STEEL FROGS FOR 70 TO 100 LB. RAILS



Operators Corner

Help Coal and Iron Ore Shipments Stand the Cold

FREEZEPROOFING winter shipments has for several years been a practice among coal and iron ore mine operators. When calcium chloride is used it may be added by vibrating feeders to the material as it passes over the conveyor belts into cars, or it may be applied to loaded cars with hand shovels. In certain cases, calcium chloride solution is applied through spray bars to coat the coal or iron ore with the freezeproof solution as it is loaded into cars. Regardless of how the calcium chloride is applied, it results in freezeproofing the shipments and making them easier to unload at destination.

The accompanying chart is reproduced as an aid in



determining how much calcium chloride should be used per ton of coal depending on the surface moisture and the temperatures to which the coal must be freezeproofed.

A good rule to follow when freezeproofing iron ore shipments with dry or flake calcium chloride with temperatures around 0°F is to use 13 lb per ton of ore, when the ore has a 12½ percent water ratio. For temperatures below 0°F

POUNDS FLAKE CALCIUM CHLORIDE PER TON OF COAL

Temperature Degrees F.	3% Surface Moisture	6% Surface Moisture	9% Surface Moisture
+32 to +15.....	3.0 to 4.5	6.0 to 9.0	9.0 to 13.5
+15 to 0.....	4.5 to 6.0	9.0 to 12.0	13.5 to 18.5
0 to -15.....	6.0 to 7.5	12.0 to 15.0	18.0 to 22.5

use 13 lb per ton of ore plus 0.65 lb per degree Fahrenheit below zero.

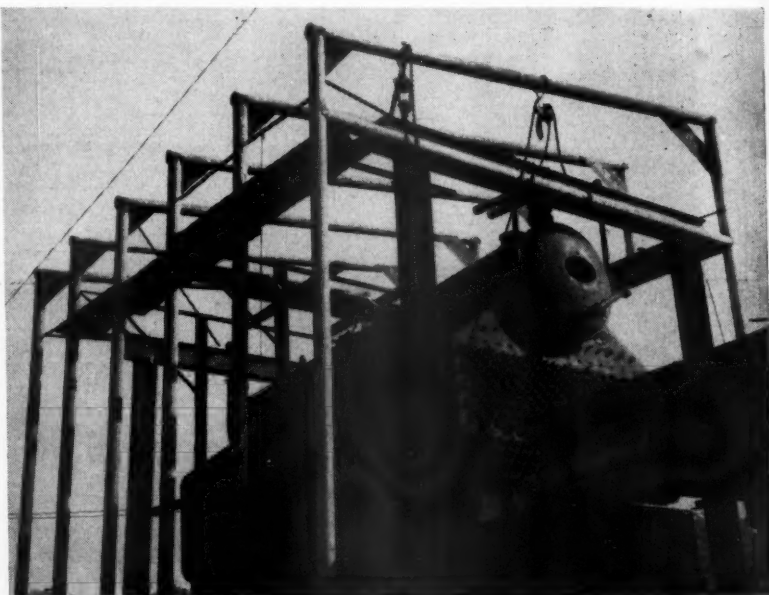
When using calcium chloride solution to freezeproof ore shipments, prepare the solution at the rate of five lb of calcium chloride for each gallon of water. When ore contains 12½ percent moisture and temperatures are around 0°F, use four gal of solution per ton of ore plus about one quart of the solution for each degree Fahrenheit below zero.

Old Boiler Tubes Cut Building Cost

WHEN the Venedy, Ill., Coal Co. at Venedy, Ill., decided to build a new engine house, the frame work of the structure was made entirely from old boiler tubes, salvaged from a discarded boiler.

The tubes, four in. in diam, were used as framework as shown, joined by welding. All work was done on the spot by company welders. The cost was appreciably lower than it would have been if conventional materials had been used.

After the girders were up, channels were welded to the frame and aluminum siding was fastened in place.





Wheels of GOVERNMENT



As Viewed by HARRY L. MOFFETT of the American Mining Congress

THE Second Session of the 83rd Congress bids fair to be one of the busiest and most important in our history. The Administration has now been in office sufficient time to get its bearings and to determine what legislative program is needed in the years ahead to carry out its promises to the electorate. It has had a breathing spell during the Congressional recess, during which it has shored up its control over the administrative departments and agencies. Now it must produce a program that will maintain its strength in Congress and receive the general approval of the public.

Near the end of December the President held a series of sessions with Capitol Hill lieutenants and whipped into shape his "dynamic program" for Congress. He met with the chairmen of the various Congressional Committees and with those that will handle the legislation on the floors of both Houses. This was the first time in history that such a move has been made. As this is being written, that program will be delivered in person to a joint session on January 7.

From the standpoint of mining, the next Congress will have a host of measures before it that will directly affect the industry. Tax bills, expansion of social security, contract renegotiations, mining law revision, Trade Agreements Act extension, restrictions on imports of residual fuel oil, lead-zinc tariffs, proposals for restoring the convertibility of the dollar into gold, labor law revision, and U. S. minerals policies, are only some of the many matters affecting mining that are expected to receive active consideration during the session. These and other general legislation, including appropriation bills, must be acted on in a relatively short time, inasmuch as Congress is likely to adjourn by early summer in order to return home to court votes for the 1954 elections.

T-H Revision Doubtful

Unless the White House puts a great deal of steam behind its drive to revise the Taft-Hartley Act, the

chances are that the present law will remain on the books unchanged for this year.

Carrying the ball for the President's Taft-Hartley revision program within the White House are special counsel Bernard Shanley, and Presidential aides Jack Martin (former administrative assistant to the late Senator Taft) and Gerald D. Morgan. The latter is often credited with drafting the Taft-Hartley Act.

While much of the 19-point labor law revision program championed by former Labor Secretary Durkin has been junked by the Administration, it is likely that the White House will press for approval of some of those proposals. It is expected that the President will seek removal of the non-Communist affidavit provision of the law and its replacement with more general legislation dealing with the entire Communist issue; an easing of union security curbs in industries where employment is of a temporary nature; statutory authority for the NLRB's present practice of refusing to hold unions responsible for the acts of individual members solely because they belong to a union; simplified requirements as to financial statements required of unions, and a provision making it unlawful to demand negotiations during the term of a labor contract on matters not covered in the contract. It has been disclosed that the White House will not seek to void all State "right to work" laws.

The Administration program is likely to be "pro-labor" but not sufficiently so to please the unions. It will meet with stiff opposition from numerous industry spokesmen, and members of Congress are likely to sidestep this highly controversial field since it is so close to election day. Thus the most candid and general view expressed around Washington is that Taft-Hartley will remain as is or be changed only in minor respects.

Meanwhile House Labor Committee Chairman Samuel K. McConnell has indicated that he expects to push for amendments to the law to (1) limit Federal authority so as to permit states to govern the relationships be-

★ ★ ★ ★ ★ ★ ★ ★

Washington Highlights

T-H REVISION: Doubtful.

REVENUE CODE: Revamping likely.

TAX AMORTIZATION: New goals set.

TARIFF: Policy changes sought.

MINERAL POSITION: Undermined by White?

USBM OPERATIONS: Under study.

RESOURCES CONFERENCE: Mineral policies discussed.

★ ★ ★ ★ ★ ★ ★ ★

tween small employers, their employees and organized labor; (2) give the states the right to govern the conduct of strikes and picketing within their borders; (3) strengthen the secondary boycotts ban of the Act; (4) broaden the power of the President over national emergency strikes; (5) create a special agency to determine the fact of Communist domination in any group, adopt procedures encouraging union members to rid themselves of such leadership, and provide that employers shall not be required to bargain with a Communist-dominated union; (6) strengthen the definition of the term "supervisors" to make certain that those excluded from the term "employees" are in fact a part of management; and (7) provide for more adequate supervision of union welfare funds, possibly by state insurance commissions. McConnell has said that he will oppose any attempts to outlaw state laws covering the right to work.

Tax Revamping in Offing

The intensive study conducted during the Congressional recess by the Joint Committee on Internal Revenue and Treasury Department aides is likely to culminate in a thorough overhauling of the Revenue Code at this session of Congress. Statements made by those close to this work indicate that there will hardly be a single

section of the Code that will not undergo some rewording. For the most part, the changes will be of a technical nature but it is expected that they will bring some tax benefits to both individuals and corporations.

In addition, Congress is faced with the question of how to terminate the Korean-war 10 per cent rise in individual income tax rates, the excess profits tax, and the temporary increase in corporate rates, and yet raise enough revenue to meet the cost of running the Government.

Capitol Hill observers are freely predicting that the individual income tax rates will be reduced and the excess profits tax taken off, but they are not so sure that more than a small reduction may be made in corporate rates. "Trial balloons" instituted by the Administration as to the feasibility of adopting a sales tax at the manufacturers' level have met with an outcry of opposition so strong that such a levy is not likely to receive any Congressional consideration.

The tax picture is also complicated for the individual by the fact that the payroll levies for Social Security will be boosted another half per cent. House Ways and Means Committee Chairman Dan Reed and several other strong members of the Committee have declared that this increase must go into effect if the social security program is to be kept on a sound financial basis. The Administration is seeking to postpone this boost and has the support of some of the other leading members of the Ways and Means Committee.

Also on the financial front, the Administration will renew its demand for a \$15 billion hike in the national debt limit. The House has already approved this boost but so far the Senate Finance Committee has refused to get behind it.

Tax Amortization Goals

Defense Mobilizer Arthur Fleming has invited industry to apply for accelerated tax amortization certificates to stimulate the output of 68 items needed for the national defense program. The revised list constitutes a considerable reduction in the number of commodities that may fall within the program.

The following commodities of interest to the mining industry are still open to accelerated tax amortization applications: alumina, asbestos, antimony, barite, bauxite, beryl, chemical grade chromite, cobalt, metallurgical coal, by-products coke, columbite and tantalite ores, copper, synthetic cryolite, acid-grade fluor spar, freight cars, inland waterway vessels, iron ore and taconite, lead, manganese (battery and chemical grades), mercury, molybdenum, nickel, Great Lakes or carriers, rare earths, rutile, selenium, titanium metal, tungsten ore, and zinc.

Tariff Changes Sought

A determined drive will be made at this session of Congress for enactment of a quota limitation on residual oil imports which are causing serious harm to the domestic coal and railroad industries.

Groundwork for this drive was laid at a recent meeting of the Foreign Oil Policy Committee, which is composed of management and labor representatives from the bituminous coal, anthracite, metal and nonmetallic mining, domestic oil, railroad and related service industries. Representatives of the American Mining Congress participated in this meeting, and the AMC will strongly support efforts to obtain protection for the coal industry from the flood of foreign residual oil that daily is curbing coal production and displacing American mine labor.

At the meeting of the Committee, resolutions were adopted calling for a quota limitation on residual oil imports, and for a reexamination of the nation's foreign trade policies to determine whether such policies are serving the best interests of the nation's economy and security. Prior to adoption of the resolutions, Senator Matthew Neely of West Virginia, Congressman John Saylor of Pennsylvania, and George Sokolsky, well known columnist and radio commentator, warned of the danger of free trade in general and residual oil imports in particular.

John T. Jones of the United Mine Workers told the gathering that his organization was in this fight to the finish and that the UMWA would do everything possible to obtain passage of legislation curbing foreign oil imports.

It is expected that measures to obtain this objective will be introduced quickly in Congress.

Meanwhile, the U. S. Tariff Commission still has under study the pleas for relief for lead and zinc producers under the "escape" clause provision of existing law. Efforts will also be renewed to get Congressional approval of an anti-dumping tax to relieve the distressed conditions prevailing in the lead and zinc mining industries.

Mineral Studies

A Senate Interior Subcommittee, headed by Senator Malone of Nevada, continues to study the mineral self-sufficiency of the United States.

During the past month the committee heard Interior Secretary McKay state that imported oil is essential to U. S. defense, and that it posed no danger to domestic oil producers.

Coal industry spokesmen carefully outlined the necessity for maintaining a healthy domestic coal industry if the national welfare and security is to be preserved. They called atten-

tion to the disastrous effects which present unrestricted imports of residual oil are having on the industry and the need for legislative relief to offset them.

At earlier hearings the committee looked into the U. S. position with respect to titanium and uranium. Air Force Secretary Talbott called for immediate steps to increase the supply of titanium to meet military and industrial needs. He said that every assistance should be given to all potential producers of the metal. ODM is currently reviewing the situation. As to uranium, the committee was told that U. S. production of uranium ore will be doubled within the next two or three years. Witnesses declared that the biggest stumbling block to national self-sufficiency in fissionable materials is the Federal tax structure, and urged an increase in the depletion allowance from 15 to 27 1/2 per cent.

During the hearings, Senator Malone released copy of memoranda written by Harry Dexter White in 1945 to former Treasury Secretary Morgenthau and to President Roosevelt, urging the United States to depend upon foreign countries for essential raw materials and to conserve our own by leaving them in the ground. It was pointed out this same philosophy has prevailed within the State Department.

Review of USBM

Interior Secretary Douglas McKay has appointed a survey team to investigate the organizational structure and operating procedures of the U. S. Bureau of Mines.

Heading the group is Dr. Curtis L. Wilson, dean of the Missouri School of Mines. Other members of the survey team include: John C. Kinnear, Sr., retired vice-president, Kennecott Copper Corp.; D. L. McElroy, vice-president, Pittsburgh Consolidation Coal Co.; J. S. Butler, president, Butler-Johnson Corp., Shreveport, La.; Spencer S. Shannon, former director of materials for the National Security Resources Board; and Henry Caulfield, of the Interior Department's technical review staff. Caulfield is serving as staff assistant to the survey team.

The group is studying operations of the Bureau in Washington and in the field. Its final recommendations and report are to be made to Secretary McKay by January 30. The group is to report as to what is being done by the Bureau, whether the work is being accomplished efficiently, and whether there are other means of conducting the work more efficiently.

Future Resources

On December 2, 3 and 4, some 1472 industrialists, labor representatives, scientists, conservationists, and offi-

(Continued on page 66)

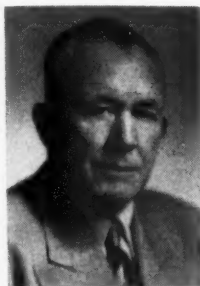


Personals

Merrill E. Shoup, president of the Golden Cycle Corp., has been chosen program chairman for the annual meeting of the Colorado Mining Association in Denver, Colo., January 28 through 30.

George O. Tarleton, president, Consolidation Coal Co. (Ky.) has been named president of the Kentucky Mining Institute to replace E. K. Newman. Vice-presidents are S. A. Fox, H. E. Knight and Fred Stewart. A. D. Sisk was re-elected secretary-treasurer.

Arthur H. Bunker, president of Climax Molybdenum Co., has announced that C. J. Abrams has been made head of a newly created exploration division of the company. Succeeding Abrams as general manager of Western operations for Climax is **Fran's Coolbaugh**, resident manager of the Climax, Colo., operations.



C. J. Abrams

Abrams joined Climax Molybdenum Co. in 1928 and except for a three-year period from 1936 to 1939, has been with the company since that time. He served as superintendent of both mine and mill before becoming general superintendent in 1939 and general manager in 1951.

Coolbaugh joined Climax in 1933, rising to assistant mill superintendent before World War II. After four years service with the Army Engineers, he returned to Climax as mine foreman, from which point he advanced to resident manager.



Frank Coolbaugh

William L. Husk, West Kentucky Coal Co., recently succeeded **Herman**

E. Knight, Bell & Zoller Coal Co. as president of the Western Kentucky Mining Institute.

The Lake Superior Iron Ore Association recently announced the appointment of **Hugo E. Johnson** as a vice-president.

A prominent research engineer in the iron and steel industry since 1925, Johnson has been assistant manager of the Project Development Group of the Battelle Memorial Institute for the last five years. Previously, he was associated with

The Youngstown Sheet and Tube Co., and the United States Steel Corp. in research and engineering positions.

Clinton P. Mott has been named industrial engineer for the Utah Copper Division of Kennecott Copper Corp. The appointment was announced by L. F. Pett, general manager of Utah Copper. Before his promotion, Mott served as job evaluation engineer with the Utah Copper Division.

Robert Dechert has been elected to the Board of Managers of The Lehigh Coal and Navigation Co.

H. S. Fowler, formerly general superintendent of fluorspar operations in Fallon, Nev., for Kaiser Aluminum and Chemical Corp., is now doing exploration work for Kaiser out of Oakland, Calif. He has been succeeded by **Harley Phillips**.

Several changes in personnel have been announced by the Olga Coal Co. Captain **William A. Laird** retired October 31 as superintendent at Olga No. 1 mine. He had served in several supervisory and administrative capacities at the operations of Olga Coal and its predecessors since January, 1919. **Homer Hickam** succeeded Laird as superintendent. Hickam was mine foreman at Olga No. 1 for the past several years. Coy Allen was pro-

moted from assistant to the superintendent to mine foreman, succeeding Hickam. C. M. Fitzgerald, a mine shop foreman, retired October 31 and W. Gordon Mason, personnel manager, retired November 30. Both were long-time employees of Olga Coal and its predecessors.

Plato Malozemoff has been elected president of Newmont Mining Corp., succeeding **Fred Searls, Jr.**, who has been named chairman. **Charles F. Ayer**, chairman since 1947, was named honorary chairman. **Franz Schneider**, executive vice-president, has retired. **Philip Kraft** and **M. D. Banghart** were named vice-presidents.

Richard C. Newbold, **W. Julian Parton**, and **John C. Bolinger, Jr.** were elected vice-presidents and directors of the Lehigh Navigation Coal Co. at the November meeting of the Board of Directors, it was announced by President **Glenn O. Kidd**.

D. C. Helms and **Robert E. Hobart**, both of Lansford, resigned as directors of the company, November 23. They have been members of the Board since 1948. Both men have retired after many years of active service with the company. **George S.**



R. C. Newbold



W. J. Parton



J. C. Bolinger, Jr.

Roy was elected secretary and treasurer of the company during the same meeting.

Newbold heads the Old Company Sales office in Philadelphia, and will now become vice-president in charge of sales. **Parton** has been general manager of the company since March, 1951, and **Bolinger** has been assistant to the president for 3½ years.

A. W. Hoover, office manager for Federal Mining and Smelting Co. and the American Smelting and Refining Co. in Wallace, Idaho, retired October 31. He had been office manager since 1918 and had worked for Federal since 1916. Federal was merged with American Smelting and Refining on May 1.

— Obituaries —

A. L. Lynn, vice-president, Island Creek Coal Sales Co. has announced the appointment of **J. Halton Green** as manager of Advertising and Merchandising of the Island Creek Coal Sales Co. Green's headquarters will be Huntington, W. Va.

The Cleveland-Cliffs Iron Co. recently announced the election of **J. P. Long**, formerly assistant treasurer to treasurer; and **R. M. Kimmel**, formerly assistant secretary to secretary.

Southern Coal Producers Association, at its annual meeting held recently, re-elected **Joseph E. Moody** president for another year. **Walter R. Thurmond** continues as secretary and **Laurence E. Tierney** as treasurer. The executive committee of the association has as its members **L. Ebersole Gaines**, **Henry F. Warden**, **Frank M. Medaris** and **L. Newton Thomas**.

Donald F. Haskell, formerly with the American Smelting & Refining Co. in New York, has joined Mintstone Quarries, Inc., Salome, Ariz.

George E. Daugherty retired from the Red Parrot Coal Co. January 1, after 19 years with the company. He is widely known as a coal mining safety director. At one time he worked as a government mine inspector in Kentucky, Virginia and Tennessee.

A. L. Foscue has been appointed president of Electro Metallurgical Co. and United States Vanadium Co., Divisions of Union Carbide and Carbon Corp.



A. L. Foscue

Foscue succeeds **Walter E. Remmers** who becomes chairman of both the Electro Metallurgical Co. and United States Vanadium Co., and a member of the Appropriations Committee of Union Carbide. Remmers is also a vice-president of Union Carbide and Carbon Corp.

Francis J. Hoyne has been named vice-president in charge of sales and sales manager for Peabody Coal Co. He succeeds **Glenn M. Shaeffer**, who retired. **Andrew F. Conlin** has been appointed executive vice-president of Crerar Clinch Coal Co., succeeding **Frank Reed**, who resigned.

The appointment of **George Burnham, IV**, as assistant to vice-president of United States Steel, located in Philadelphia, was announced by **Lewis M. Parsons**, vice-president, Philadelphia. Burnham was supervisor of personnel and training with the Oliver Iron Mining Division in Duluth, Minn.

Henry J. Crawford, 86, one of the pioneer organizers of the Mountain Fuel Supply Co., Salt Lake City, died recently. He was a director and a vice-president of the firm.

George A. Roos, vice-president in charge of operations for The Philadelphia and Reading Coal and Iron Co., died November 29.

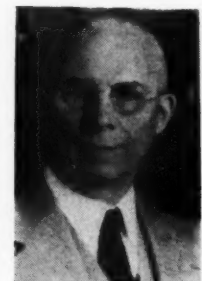
He was born January 17, 1885, and first started work for The Philadelphia and Reading Co. in 1904 as a blacksmith's helper at Locust Gap. He advanced to chairman and transitman on the Ashland Engineering Corps and served as division engineer of the St. Clair Division from 1917 to



1923, when he was appointed superintendent of Wadsworth Colliery.

In 1926, Mr. Roos was appointed division superintendent at St. Clair and served in that capacity until 1928, when he was appointed superintendent at Eagle Hill Colliery. Later that year he was appointed assistant general manager and in 1937 was named general manager. On November 1, 1947, Mr. Roos was appointed vice-president in charge of operations of the company. Besides his many activities with the company, he was active in Coal Conventions of the American Mining Congress.

Charles A. Vignos, Sr., 86, president of the American Mine Door Co., died at his home in Canton, Ohio, December 1, following a heart attack. He had been in apparent good health and was leaving for his regular



Tuesday night bowling session when stricken. Mr. Vignos had been active in business and industrial circles in Canton for 66 years. Starting his business career as a shoemaker, he later went into the cutlery business and in 1917 became manager of the American Mine Door Co., rising to the presidency of that company.

Mr. Vignos was long an active member of the Manufacturers Division of the American Mining Congress.

R. B. Caswell, president Ermont Mines, Inc., Portland, Ore., passed away November 5.

Pope Yeatman, 92, internationally known mining engineer, died December 6 at his home in Chestnut Hill, Pa. Mr. Yeatman was described as the dean of American engineers by the AIME when he was awarded the Saunders Medal in 1934.

He went to South Africa in 1895 as assistant consulting engineer to develop gold mining. Returning to this country in 1904 as chief engineer for the Guggenheim mining interests, Mr. Yeatman assisted in developing the Chile Copper Mine, Chile, and also investigated Guggenheim interests in Alaska and China.

During World War I he served as a dollar-a-year man under **Bernard Baruch** and after the war made a study of mines in Belgium and France.

Dr. Lewis E. Young, 75, widely known consulting engineer and one of the early advocates of mechanical mining in the coal industry, died in Pittsburgh, Pa., on December 27.

A leading mining engineer, Mr. Young was graduated from Pennsylvania State College in 1900. He became an instructor at Iowa State College, leaving that post to become Professor of Mining at the Colorado School of Mines. He then became director of the Missouri School of Mines & Metallurgy and in



1915 went to the University of Illinois to study mining problems. From 1918 to 1926 Dr. Young was manager of the steam heating department of the Union Electric Co. of St. Louis and in 1927 was elected vice-president of Pittsburgh Coal Co. in charge of mining operations. He remained with Pittsburgh Coal until 1939 when he began his career as a consulting mining engineer.

Dr. Young was chairman of the national committee on mechanized mining of the American Mining Congress when that committee undertook a mechanization survey of the coal industry in 1926. This was the beginning of the present Coal Division of the American Mining Congress in which Dr. Young has always been active.

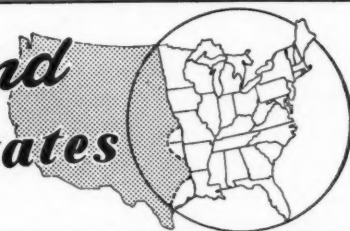
His insight into the problems of mechanical mining and his optimistic outlook on the future of coal were well known by the entire industry. In addition to his many other honors he was president of the American Institute of Mining and Metallurgical Engineers in 1949.

NEWS

and VIEWS



Eastern and Central States



Survey USBM

Secretary of the Interior Douglas McKay has appointed a seven member survey team to investigate the organizational set-up and operating procedures of the Bureau of Mines.

Dr. Curtis L. Wilson, dean of the Missouri School of Mines, will be chairman of the group. Associated with him will be: John C. Kinnear, Sr., assistant to the director, Office of Defense Mobilization; Dennis Lee McElroy, vice-president, Pittsburgh Consolidation Coal Co.; J. S. Butler, a petroleum man; and Spencer S. Shannon, director of the materials office of the former National Security Resources Board. Henry Caulfield of the Bureau of Mines' technical review staff, will serve as staff assistant to the team.

The objectives of the survey are to determine what is being done; whether the work is being accomplished in an efficient manner; and whether there are other means of accomplishing the work more efficiently.

N. J. Zinc Purchases Virginia Mine

The New Jersey Zinc Co. has announced the purchase of a mining property in Mineral, Va., 48 miles northwest of Richmond, Va. The property, known as the Arminius Mine, has been inactive for nearly 30 years.

The company has had the property under option for purchase since 1951,

at which time a program of exploration was started to determine the potentialities of its mineral deposits, principally with respect to zinc and lead. Diamond drilling has been under way for some time. The results of this drilling led to the decision to purchase the property, unwater the mine and continue exploration at depth. Pumping and mining equipment necessary for these operations will be installed as soon as possible.

The work will be conducted under W. L. Albers, superintendent of the company's Austinville, Va., operation.

Now Bauxite

An item in the *Daily Metal Reporter* reports that Yugoslavia plans to ship bauxite to the United States for sale to domestic producers of aluminum. Yugoslavia has large bauxite deposits, its reserves being estimated at 90,000,000 to 100,000,000 tons, having a content of 50 to 60 percent monohydrates and a silica content of one to two percent.

Homes for Reserve Workers

Construction of 300 more new homes and an 18-classroom school at Reserve Mining Co.'s new town near Beaver Bay, Minn., began recently.

Being built for the families of workers at the huge taconite processing plant Reserve is constructing there, the houses will be ranch-style, single story, in 10 different exterior combinations. There will be 255 three-bedroom houses and 45 two-bedroom houses in this 1953 group.

Last year, Reserve erected 64 housing units at this townsite. At Babbitt, where Reserve's taconite mine and small processing plant are located, 129 houses have been built.

By 1957, when the big plant near Beaver Bay is expected to be producing 3,750,000 tons of iron ore pellets from taconite annually, the two towns may have a combined population of more than 9000.

John W. Galbreath & Co. has been employed by Reserve Mining Co. to build and develop both new towns Reserve is constructing, a company official said.

PETER F. LOFTUS CORPORATION

ENGINEERING and ARCHITECTURAL CONSULTANTS and DESIGNERS

First National Bank Bldg.
Pittsburgh 22, Pennsylvania
Cable Address
"LOFTUS Pittsburgh"

J. W. WOOMER & ASSOCIATES

Consulting Mining Engineers

Modern Mining Systems and Designs
Foreign and Domestic Mining Reports

UNION TRUST BLDG.
Pittsburgh, Penna.
NATIONAL BANK BLDG.
Wheeling, W. Va.

DAVIS READ

Consulting Engineer

Layout Operation
Modern Production Methods
Plant Design Preparation
Chicago, Ill. Madisonville, Ky.
120 S. LaSalle St. 235 East Noel Ave.

Tenn. Titanium Plant

Contract for construction of a titanium plant at Chattanooga, Tenn., for Cramet, Inc., has been awarded to Turner Construction Co. of New York. Vitro Corp. of New York is in charge of project management and engineering for the plant.

Cramet is a subsidiary of the Crane Co. Upon completion, the plant is expected to produce 6000 tons of metal annually when it reaches peak production, probably in 1956.

Conservation Contest

The eleventh Annual Conservation Essay contest will open January 11 and continue through April 9, with the topic "Our Mineral Wealth" announced as the subject.

More than 200 high schools are expected to enter the competition in this popular event sponsored annually by the Minnesota Federation of Women's Clubs, Minnesota Department of Conservation cooperating.

Approved by the Minnesota Association of Secondary School Principals, the contest is in charge of Mrs. E. R. Starkweather, president of the Federation. Mrs. Ole Aune is conservation chairwoman for the Clubs.

Reference material on "Our Mineral

Wealth" may be secured by writing Iron Mining Industry of Minnesota, 506 Sellwood Bldg., Duluth, Minn.

As in the past, 10 boy and 10 girl winners, two from each of the M. F. W. C. districts, will be chosen and awarded a week's all-expenses-paid stay at Douglas Lodge, Itasca State Park.

Begin Sulphur Production

Standard Sulphur Co. has announced initial production of sulphur from an 800-acre leasehold at Damon Mound in Brazoria County, Texas. The company is operating two wells, the Damon No. 1 and No. 2, and is producing about 250 tpd. The Frasch method of mining is used.

Auger Mining in W. Va.

Auger mining is on the increase in West Virginia, at least there are more augers in operation. According to the State Department of Mines, 38 units were in operation during 1952, working 3811 man-days to produce 9338 tons per day for a total output of 1,180,590 tons. During 1953, there were 51 units working which produced 541,817 tons for the first six months of the year.

Rename Monsanto Division

Monsanto Chemical Co. has made several major changes in its organizational set-up. Among the changes is the renaming of the phosphate division. After January 1, this division will be called the inorganic chemicals division and will be headed by vice-president J. L. Christian as general manager. In addition to the five phosphate division plants, the new inorganic division will also operate the Merrimac division plants at Everett, Mass., and Camden, N. J.

Find Minerals in Florida Sand

Dr. J. Calver of the Florida State Geological Survey has announced that extensive deposits of ilmenite and rutile have been discovered in the sands along the Gulf of Mexico in the vicinity of Panama City, Fla. According to Calver, the samples showed a mineral content of up to 14 percent with about half of that being ilmenite and rutile.

Two other deposits of mineral-bearing sands in Florida have been worked for many years, one east of Jacksonville by the National Lead Co. and the other near Starke by E. I. du Pont de Nemours & Co.

All in the day's work . . .
All that's needed in a shift's cutting
operation is a pocketful of Bowdill Throw-
away Bits per machine. This ease of hand-
ling and changing make Bowdill Bits popular
with MACHINE operators . . . long life and
coarse cuttings at low cost make them
popular with MINE operators. And there's
no economy in resharpening bits when you
get so many tons per point.

Survey Pennsylvania's Resources

Pennsylvania's mineral resources are in for a new comprehensive inventory by the state's Department of Internal Affairs.

According to William S. Livengood, secretary of Internal Affairs, the inventory will be a cooperative undertaking of the department and the School of Mineral Industry of Pennsylvania State University. Internal Affairs will provide the descriptive text, and the university's school will furnish the statistics.

It is expected that the new edition of "Pennsylvania's Mineral Heritage" will be off the press some time in 1954.

Expanding Feldspar Department

International Minerals & Chemical Corp. is making substantial progress in the expansion program of its Consolidated Feldspar Department in the Industrial Minerals Division, Norman J. Dunbeck, vice-president in charge of the division, has announced.

In addition to planning three new plants, existing equipment is being enlarged and brought up to date. Shovels, bulldozers and trucks are being replaced with new and larger units. Dust collecting and water

clarification systems are being installed. Flotation capacity of Spruce Pine, N. C., has been increased by 50 percent, and new fine-grind facilities installed at Erwin, Tenn.

The main quality-control laboratory at Kona, N. C., has been revised and enlarged. New research projects have been started for the Feldspar Department by International's Research Division, and two other such projects have been assigned to outside laboratories.

Regarding the new plants, Dunbeck explained that diamond drilling has been completed on International's extensive reserves of feldspar ore in southern Connecticut. Plans are being drawn for a feldspar plant there which will probably employ the Le-Baron-Lawver dry beneficiation process, resulting in substantially lower production costs than obtained with conventional methods of beneficiation.

Diamond drilling is also under way on International's nepheline syenite properties in southern Ontario. It is expected that a new, modern mill for processing this material will be built at Blue Mountain, Ont., and should be in operation by the middle of 1954.

"These two new units in Connecticut and Ontario are part of a long-range plan, and it is expected that a third



large unit, a feldspar plant, will be constructed within about one year," Dunbeck stated.

Close Down Maitland

The Maitland mine of Eastern Gas and Fuel Associates, in McDowell County, W. Va., has been closed. The present depressed market for coal was cited as the principal reason for the closing. A company spokesman said the operation will be down for an indefinite period. The mine had been producing 1200 tons daily on a three-day week for some time.

The mine at Maitland is one of the older coal operations in the Pocahontas Coal Field, having been opened by the Houston interests. Houston sold out to the Koppers Co. in the 1930's, and Eastern Gas and Fuel acquired the properties from Koppers.



Mich. Power Co.s Unite

Messrs. V. P. Geffine, president of The Cliffs Power & Light Co., and J. D. Preston, general manager, announced that an agreement had been signed between the Upper Peninsula Power Co. of Houghton, Mich. and The Cliffs Power & Light Co. of Ishpeming, Mich. whereby the Upper Peninsula Power Co. will take over the transmission and distribution facilities of the Cliffs Company, and, in the future, will supply electric energy to the customers formerly served by The

Cliffs Power & Light Co. These customers are the iron mines other than Cleveland-Cliffs mines, and other industrial, wholesale and retail customers in the vicinity of Ishpeming, Negaunee, Munising and the Inland Lime & Stone Quarry located near Blaney. The Upper Peninsula Power Co. will transmit power from the Cliffs plants to the operations of The Cleveland-Cliffs Iron Co. The Cliffs power company is a wholly owned subsidiary of Cleveland-Cliffs. Geffine also stated that, through the formation of the Upper Peninsula Generating Co., the

two companies will jointly own and construct a lakeside steam generating plant, the tentative location being in the Marquette area. J. H. Warden, president of Upper Peninsula Power Co., will also be president of the generating company.

The Upper Peninsula Power Co. will also build a transmission line from Humboldt to Atlantic which will interconnect its present system with that of the system to be acquired from the Cliffs power company.

Geffine stated that this was a major forward step in the development of the territory inasmuch as it will give both areas the economical advantage to be obtained from a large, centrally located generating plant. An economy will not only be made from the construction of such a plant, but also in its operations, and by having the two systems tied together it will enable them to take advantage of the diversity in the two systems. Preliminary engineering and design work has been under way for some time on the new steam facilities. The first unit of 22,000-kw capacity is scheduled for completion not later than January, 1956.

With the development and beneficiation of low grade iron ore mining which Cleveland-Cliffs is undertaking in the Humboldt and Republic areas, together with other increased mining operations, the use of power in the area will be more than doubled during the next few years. The companies realize that an ample supply of low-cost, dependable power is one of the basic necessities that must go into any such future developments.

While the agreement has been signed by the two companies and commitments have been made for most of the financing, it was explained that on a deal of this size there was a tremendous amount of detail work which had to be completed, such as obtaining the approval of Federal and State regulatory bodies, and that this work was being pushed as rapidly as possible so that the transfer of properties could be made.

Honor First Aid Champs

The first aid team from Pardee & Curtin Lumber Co. Bergoo No. 4 mine, winners of the National First Aid Championship this year, were honored at Webster Springs, W. Va., December 6. Among the many dignitaries who gathered to pay homage to the six men who first won the West Virginia Mid-State institute's contest and then went on to achieve national renown by triumphing over 46 other highly skilled first aid teams at Fort Wayne, Ind., in early October, was West Virginia's Governor Marland.

The team is composed of George Bonovich, captain; Ira Stidom, Francis Frazee, A. E. Cutlip, James Stump and Clyde Coakley, Jr.

THE
Leahy
HEAVY DUTY

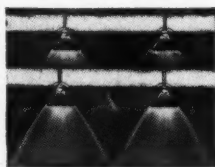
**NO BLIND
VIBRATING SCREEN**



**For Fine Mesh Screening
With or Without Heat**

When it comes to difficult fine mesh screening, the Leahy No Blind Vibrating Screen is leading the parade.

Long since acclaimed for its differential vibration that clears the mesh of intermediate size wedging particles, the Leahy also offers as optional equipment FlexElex electric heating of screen jackets. FlexElex keeps the mesh dry and wide open for full capacity production. Unexcelled for the screening of damp fines. Send for complete information and Bulletin 15-J.



CONCENCO SPRAY NOZZLES

These handy nozzles are simple, flexible and economical. All you do is drill your holes, clamp on and get results. They can be definitely aligned for washing, sluicing or spraying according to need. They are removed or replaced in a moment's time.

**THE DEISTER[★]
CONCENTRATOR
COMPANY**

**CONCENCO
PRODUCTS**

★ **THE ORIGINAL Deister Company** ★ Inc. 1906
917 Glasgow Ave. • Fort Wayne, Ind., U.S.A.

Cut Coal Output

Island Creek Coal Co. has reduced production at four mines in Logan and Mingo counties, W. Va. The mines affected are the No. 7 and No. 22 at Holden, Logan County, and Mines 24 and 25 at Ragland, Mingo County. About 600 miners were laid off at the four mines which normally employ about 21,000 workers.

Expand Mica Plant

A two-year expansion and improvement program is nearing completion at Westinghouse Electric Corp.'s mica plant at Irwin, Pa., it was announced recently by C. H. Treloar, plant superintendent.

Highlighting the expanded mica manufacturing facilities is the addition of a two-story building. Operations carried on in this building will supplement those in four other buildings on the 20-acre site purchased by Westinghouse in 1948 from General Foods Corp. The lower floor of the new structure will be used to store raw materials; the second floor will be devoted mainly to the manufacture of molded insulating parts from mica.

The new improvement program at Irwin was made necessary by increased demand for mica insulation.

Anthracite's Problem

The anthracite industry must find cheaper ways to mine coal or it will price itself out of the market, Francis O. Case, president of Glen Alden Coal Co., recently stated. He went on to say that mechanized mining must be instituted wherever possible to achieve the objective of greater production at lower cost.

Glen Alden is currently experimenting with a continuous coal mining machine at its Loomis Colliery near Nanticoke, Pa.

Atlantic Beaches Radioactive

Release of a map showing airborne radioactivity anomalies detected along parts of the Atlantic Ocean beach from Cape Henry, Va., to Cape Fear, N. C., and from Savannah Beach, Ga., to Miami Beach, Fla., has been announced by Secretary of the Interior Douglas McKay.

The anomalies represent areas of unusually high radioactivity as observed from the air and may or may not indicate the presence of uranium or thorium.

The Atlantic beach survey was part of a program of airborne reconnaissance for radioactive deposits being conducted throughout the United States by the Geological Survey for the Atomic Energy Commission.

The map showing the location of the radioactive areas is available for public inspection at the following Geological Survey offices: Room 1033,

Library, GSA Bldg., Washington, D. C.; Room 468, New Customhouse, Denver, Colo.; Grand Junction, Colo.; Room 100, Old Mint Bldg., San Francisco, Calif.; 504 Federal Bldg., Salt Lake City, Utah; Lee Bldg., Plant City, Fla.; and New Dining Hall, Florida State Univ., Tallahassee, Fla.

It will also be available for inspection at offices of the Florida Geological Survey, Tallahassee, Fla.; the Georgia Dept. of Mines, Mining and Geology, 425 State Capitol, Atlanta, Ga.; the Bureau of Mines, Rapid City, S. D., and at the following offices of the Atomic Energy Commission: New York Raw Materials Office, New York, N. Y.; Denver Exploration Branch, Denver Federal Center, Denver, Colo.; Hot Springs Suboffice, Hot Springs, S. D.; Grand Junction Operations Office, Grand Junction, Colo.; Grants Suboffice, Grants, N. M.; Salt Lake Exploration Branch, Salt Lake City, Utah; Richfield Suboffice, Richfield, Utah; and the Butte Suboffice, Butte, Montana.

The radioactivity map will be made available at the Geological Survey offices in Tallahassee and Plant City, Fla., for reproduction by those interested in obtaining copies.

Oil From Coal

A plant to produce oil from coal is nearing completion in the Orange Free State, South Africa. When completed, it will be the largest oil-from-coal plant in the world. The plant is expected to produce gasoline at a cost lower than British and American imported supplies. Initial annual production will be 50,000,000 gal of gasoline—one-fifth of that country's needs. Later the output is likely to be increased.

Eliminate Stream Pollution

Red Jacket Coal Corp.'s Wyoming mine, Wyoming, W. Va., has completed construction of sewage disposal units, filtering plants and two settling basins to eliminate stream pollution.

The two settling basins, about 200 yards from the tipples, take care of all water used in the preparation plant to clean coal. After the water leaves the coal cleaning plant, it is pumped into one of the basins and allowed to filter through sand into the Guyan River. When the basins are filled, the material that can be salvaged will be put back into the plant and the remainder scooped up by clam shells and transported to the company's slate pile.

Several years ago Red Jacket installed septic tanks in all company houses and constructed two filter plants for the mine water that is used by the entire community. One of the plants is located at Wyoming while the other is located at the bath house near the mine's Turkey Creek portal.

C-M-I CENTRIFUGAL COAL DRYERS *Cut* COAL DRYING *Costs!*

You will find the information received in response to your inquiry to C-M-I quite surprising. Centrifugal Coal Drying, as perfected by C-M-I, is far less expensive than heat drying . . . not only in day-to-day operation and maintenance, but in installation costs as well. So write C-M-I today . . . no obligation, of course.



**CENTRIFUGAL &
MECHANICAL INDUSTRIES**
146 PRESIDENT STREET
SAINT LOUIS 18, MISSOURI



Western States

Deepen Yates and Ross Shafts

A new shaft sinking program has been announced by the Homestake Mining Co. to enable that company to mine below the 5000-ft level at its Lead, S. D., gold mine. The Yates and Ross shafts will be deepened to the 4850-ft level and a transfer drift will be driven on that level to the site of a new interior shaft. Sinking of the new shaft will begin about two years hence.

Check Iron in Wyoming

Extensive testing is under way to determine the extent and value of iron ore deposits in the Beaver Creek area of Fremont County, Wyo., 18 miles south of Lander. The Ruby Co., associated with the J. R. Simplot Co. of Boise, Idaho, is making tests in an area of claims one mile wide extending three miles from the road in a western direction toward Granier Meadow. A company official has said that the deposit is "rather low grade ore."

Goldfield Mill Closes

Goldfield Consolidated Mines Co. has closed its mill 25 miles north of Colville, Wash. During 1952 the company was the No. 3 lead and zinc producer in Washington. The mill has a capacity of 350 tpd. The company suspended operations at its Anderson mine a year ago when lead and zinc prices dropped, but continued to operate the Deep Creek mine. Low lead and zinc prices were given by the company as reason for closing the mill. Future plans will depend entirely upon the market, an official of the company said.

Complete Tungsten Mill

Pessin Mining Co. of Morristown, Ariz., has practically completed its construction project and expects to start production of tungsten concentrates shortly. The concentrator, with tables and flotation equipment, has a capacity of about 75 tons in 24 hours. During mill construction some mine development has been carried on, the work consisting mainly of open cuts and preparing faces with bulldozer.

The company holds the Star group of claims in the White Picacho district, 12 miles northeast of Morristown. Al Pessin is president and in direct charge of mine work.

S.W. Miners Meet

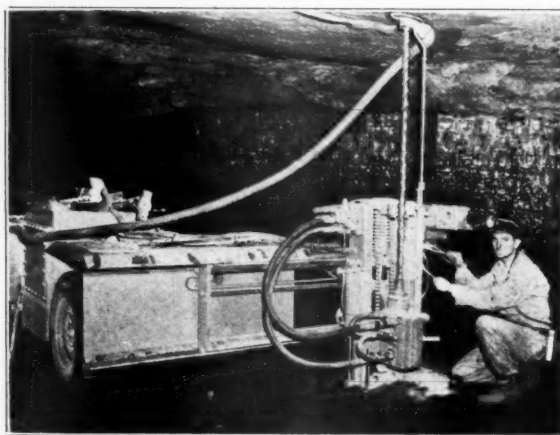
The annual "International Mining Days" get-together was held in El Paso, Texas, October 28, 29 and 30, sponsored by the New Mexico Mining Association, American Institute of Mining and Metallurgical Engineers and the Southwest International Mining Association. At the welcoming luncheon held October 29, Felix Wormser, assistant secretary for Mineral Resources of the Department of Interior, was the main speaker. He

spoke on current problems of the mining industry and said that mining companies are in a period of uncertainty because of Russia's unpredictable actions. Development of a sound minerals policy is a challenge to American leaders, he said, adding that he cannot promise ready solutions to the difficulties of the mining industry.

Andrew Fletcher, president of St. Joseph Lead Co., in an address to the convention, spoke out for a sliding scale tax or tariff to aid the mining industry. He said the sliding scale tax or tariff is necessary to save the domestic lead-zinc industry from being swamped by surpluses of imported stocks.

At the annual business meeting, all officers and directors of the New Mexico Mining Association were unanimously re-elected. In addition, two new directors, Bernard B. Kunkle, assistant manager of Phelps Dodge Refining Corp., and J. I. Moore, general manager of Haile Mines, Inc., were added to the list of directors. W. Page Morris, resident manager of Duval Sulphur and Potash Co., was re-elected president.

Carlsbad, N. M., has been selected as the site for the 1954 convention of the New Mexico Mining Association.



YES, MISTER, THIS TOP IS SANDSTONE!

FLETCHER ROOF CONTROL DRILLS give the same high capacity, trouble free, performance in every type of mine roof. In Pennsylvania, Ohio, and Virginia sandstone areas, Fletcher drills are keeping ahead with their bolting where rotary drilling was never before successful.

Write today for further information.

J. H. FLETCHER & CO.

ENGINEERED MINING EQUIPMENT

DEPT. D. P. O. BOX 353, HUNTINGTON, W. VA., PH. 44186

New Ariz. Uranium Producer

Arizona's newest uranium producer is the American Uranium Co. of Durango, Colo. Ore from the company's claims, 16 miles east of Holbrook, is shipped by rail to the ore purchase and sampling plant operated for the Atomic Energy Commission at Bluewater, N. M., by the Anaconda Copper Mining Co.

Modernize Montana Mill

Zonolite Co. is spending \$350,000 to modernize its vermiculite milling facilities near Libby, Mont., according to Raymond A. Bleich, manager of the Libby operations of the firm. The new mill techniques are expected to increase recovery of vermiculite by about 30 percent.

Beginning of the End?

Three large copper company unions have withdrawn from the International Union of Mine, Mill and Smelter Workers and joined United Steel Workers of America, C.I.O. The first local to break away from the alleged Communist-dominated mine and mill union was the Butte Miners Union No. 1. They were shortly followed by the Anaconda Mine-Mill Local No. 117 and the Butte Stationary Engineers Union. All three have received local charters from the United Steel Workers of America, C.I.O.

Last October the Anaconda union joined the Butte union in charging the Mine-Mill leadership was Communist-dominated. M. E. Travis, secretary of the union, is said to have been accused by both locals of attacking true unionists and using "party line" tactics to smear leaders.

Improve Mill Performance

Sunshine Mining Co. has reported success in changing metallurgical procedures at its big concentration plant west of Wallace, Idaho. The program was started last year and included reactivating antimony leaching facilities built during World War II but closed in January, 1944, and a revision of the mill flotation circuit.

The mill is now turning out two products instead of the one silver-lead-copper concentrate formerly produced. One is a high-grade silver-copper concentrate and the other a lead-silver-iron concentrate.

Take Over Resurrection

Complete ownership of the Resurrection Mining Co.'s properties and plants in the Leadville, Colo., district now rests with Newmont Mining Corp.

Newmont always owned one-third of Resurrection while United States Smelting Refining and Mining Co. and the Hecla Mining Co. owned one-third each.

In addition to mining claims, Resur-

Heads National Program Committee

FRANK R. MILLIKEN, vice-president of Kennecott Copper Co., has accepted chairmanship of the National Program Committee for the American Mining Congress 1954 Metal and Nonmetallic Mining Convention and Exposition. This, the year's greatest mining show, is to be held in the Civic Auditorium in San Francisco, Calif., September 20-24.

The nation-wide committee which Mr. Milliken heads will carefully sift the hundreds of suggestions received from mining men in every branch of the industry and all parts of the country. From them they will develop a program designed to help solve the problems that most perplex miners everywhere. No one with the interest of the mining industry at heart can afford to miss this outstanding program.

In addition to the important convention sessions the National Program Committee will organize, manufacturers and suppliers to the industry are planning the year's biggest exposition of mining and milling equipment and supplies. The exhibits will fill the entire area of the huge Civic Auditorium and a specially enclosed additional area of 40,000 square feet between the Auditorium and the Civic Center Plaza.

Plan now to attend the world's greatest metal and nonmetallic Mining Convention and Exposition. All hotel reservations will be handled through the San Francisco Convention and Visitors' Bureau, Room 300, 61 Grove St., San Francisco 2, Calif. This is a meeting for all mining men and their ladies.



rection has an 800 tpd differential lead-zinc flotation mill and complete mine and repair shop facilities at the portal of the Yak Tunnel. Company ore production at the property was recently stopped because of low lead and zinc prices. However, large areas have been leased to individuals. An exploration program in Iowa Gulch is being continued and the mill is handling lease and custom ores.

U-Bonuses Reach 2.5 Million

Announcement has been made by Sheldon P. Wimpfen, manager, Grand Junction Operations Office of the Atomic Energy Commission, that, as of November 6, 1953, \$2,535,000 has been paid to uranium miners in the form of bonus for uranium ores produced from eligible properties since the bonus program for initial production was put into effect on March 1, 1951. Bonus payments are being made at the rate of approximately \$125,000 per month. The provisions of the bonus program have recently been extended through February 28, 1957.

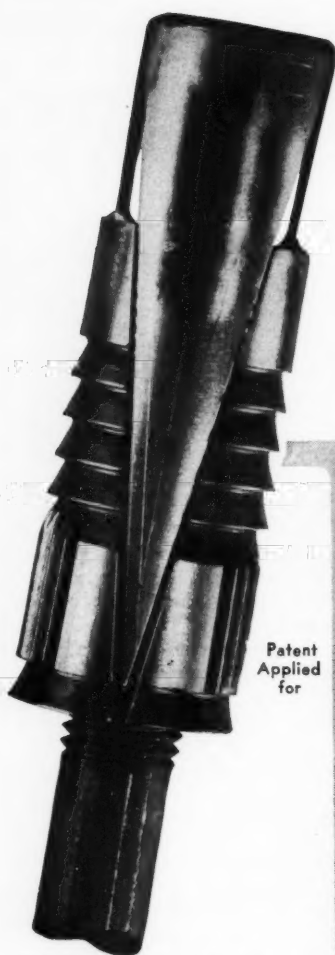
The initial production bonus has been in effect for a little over 2½ years and has contributed greatly to the finding and mining of new deposits. A total of 329 properties has

been certified as eligible for bonus payments and 1626 individual payments have been made. To date, 43 new properties have produced more than the initial 10,000 lb of uranium, and the operators have received the full benefit of the initial production bonus.

Tungsten Refinery Starts Up

The nation's third largest tungsten refinery is now operating in Salt Lake City, Utah. Jointly owned by the Salt Lake Tungsten Co., an affiliate of the Sylvania Electric Products Corp., and the Minerals Engineering Co., Grand Junction, Colo., the facility is capable of producing 200,000 lb of tungsten oxide monthly from low grade western ores. The plant is to work initially on residues left from wartime operation of a government refinery in Salt Lake City. The refinery residues are expected to keep the plant operating for 10 months on a three shift basis.

Ore will be concentrated at the H. M. & S. Milling Co., across the street from the refinery. The mill will supply some of the concentrates for the refinery, with other concentrates coming from a mill now under construction at Glen, Mont., by Minerals Engineering.



7 Advantages of the PATTIN EXPANSION SHELL For Roof Bolting

*which have brought it so
quickly into high demand*

- 1—Double the usual shell expansion.
- 2—A 3-inch parallel contact with the hole.
- 3—No definite drilling depth required.
- 4—Shell can be anchored solidly any place in the hole.
- 5—Will not turn while being tightened.
- 6—No loss of parts as wedge and shell are locked together.
- 7—No special nuts or ears are needed on the bolts.

Our engineers are available for consultation and demonstrations. Write or phone us—we'll gladly work with you on any present or future bolting program.

PATTIN
MFG. COMPANY
Marietta, Ohio
Est. 1888

Issue Mine Directory

The Mining Section of the Los Angeles Chamber of Commerce has issued as an aid to that city's industries and to facilitate the flow of minerals to that city a new directory of Arizona mines. Principal mining concerns are listed by counties. Kinds of minerals produced and names of operating personnel are also listed.

Iron-Free Arizona Asbestos

Discovery of new deposits of chrysotile asbestos in the Globe (Ariz.) area has been reported. Exploration programs, still under way, of six of the district's asbestos producers represent loans of \$180,000 by the Defense Minerals Exploration Administration. This area is the only known source of iron-free asbestos in North America.

Limestone for Sugar Plants

Morrison-Knudsen Co. has moved equipment in west of Durkee, Baker County, Ore., and is preparing to quarry limestone from a large deposit. Large scale testing will be done to determine suitability of the stone for sugar mills.

New Barite Unit Planned

A new chemical plant will be built at Wells, Nev., to process the lead-zinc-barite ore from the Polar Star mine, 27 miles south of Wells. The mine and new plant are being developed by Hadsel Products, Inc., a Nevada company headed by A. D. and Dan Hadsel of Auburn, Calif.

Wyo. Uranium Find

Central Wyoming has become the latest mecca in the never ending search for uranium. The Atomic Energy Commission has confirmed the discovery of uranium-bearing ores by Neil McNeic, who recently culminated a four-year search by discovering carnotite ore in an isolated and barren area of public lands 50 miles east of Lander, Wyo.

According to Charles C. Towle, chief of the Denver exploration branch of AEC, two AEC geologists have confirmed McNeic's find. However, because of the area's isolation, it is going to take considerable time to evaluate and determine the extent of the ore deposits.

Since the original discovery, uranium ore deposits have been reportedly found as far as 20 miles away by other prospectors. The county clerk's office at Lander, Wyo., reported that nearly 100 claims were filed in the area in less than a week, following disclosure of the original find. Several large mining companies have entered the area in addition to a multitude of individual prospectors.

Tungsten Unit Sinks Shaft

California Tungsten Corp. is sinking a three-compartment shaft at its Linka tungsten mine near Ely, Nev. The new shaft will be 300 ft deep and will serve as the main shaft for extensive exploration and development along a limestone-granite contact. The company purchased the mine from the C and C Tungsten Mining Corp.

Lease Nabob

Nabob Silver-Lead Mines has gone on an incentive leasing basis as a result of the new higher wage scale in the Coeur d'Alene area of Idaho. Nabob in recent months has been employing seven men at its Pine Creek property. Lessees will carry on mining operations in the upper workings of Nabob. The company has leased the entire mine above the 1300-level, withholding only the D-5 vein discovered on that main haulage level last year.

Wheels of Government

(Continued from page 54)

cials of Federal, State and local governments participated in the "Mid-Century Conference on Resources for the Future" in Washington. Announced purpose of the Conference was to examine the natural resources position of the United States and the developments to be anticipated in the next quarter century.

The Conference made no recommendations as to resource policies nor any recommendations for legislation to implement the views expressed during the three-day gathering. Chairman Lewis Douglas summed up the results of the meeting by saying that it "had identified domains of agreement and areas of disagreement in the approach to natural resource problems, and that the exchange of views by a wide assortment of individuals of a great variety of skills and talents had clarified the reasons for disagreement in this field."

Most of the work of the Conference was done in eight sections, meeting concurrently on various aspects of the resources problem. These sections considered: Competing Demands for Use of Land, Utilization and Development of Land Resources, Water Resource Problems, Domestic Problems of Nonfuel Minerals, Energy Resource Problems, U. S. Concern with World Resources, Problems in Resource Research, and Patterns for Cooperation. A large number of mining men were on hand for the section meetings and participated actively in them. Members of the staff of the American Mining Congress attended each section, luncheon, and dinner meeting and participated in the discussions.

Unique Method of Concreting Used at Creighton



Cement mixer underground delivers 16-cu ft batch every three min to pneumatic placer

A "PUSH BUTTON" system of blowing concrete by compressed air through pipe from underground mixing stations into construction forms has been installed by the International Nickel Co. of Canada, Ltd., at its Creighton Mine. This system of utilizing "air-borne" concrete is greatly expediting the company's program of mining by induced caving.

To stabilize areas of the mine worked and abandoned 40 or more years ago, and utilize old openings in which the timber supports have rotted and collapsed, extensive concreting is necessary. Several thousand bags of cement a month are now being used underground at Creighton to build slusher stations and drifts, box-hole brows, switchrooms and other installations required to meet the caving project's quota of 12,000 tons of ore per day.

Concrete mixing stations are located on the 6th and 20th levels. Gravel for the concrete is received at the mixing stations by gravity from surface through a raise formerly used for bringing rock fill to the various levels of the mine. Cement is brought from surface by the mine's regular transportation system.

Located in large rooms which provide ample space for cement storage, the mixers can produce a 16-cu ft batch of concrete every three minutes. It is poured into the placer, a cylinder 2½ ft in diameter by 10 ft long, into which compressed air is then introduced from the mine's main air line.

From the placer the "air-borne" concrete is blown through a line of 6-in. steel pipe which carries it up to a quarter of a mile or more from the mixing station. There it drops right

into the forms at the construction site.

At 90° turns in the line, T-bends are used; an air cushion which forms in the dead end of the T greatly reduces abrasion from the concrete. On

long curves, sections of 8-in. pipe are inserted with Ni-Hard liners.

The men operating the concrete placers take pride in the astonishing performances racked up to date. Best "up" delivery so far was a total of 1315 ft from the 20 level placer, consisting of 875 ft on 20 level, up 210 ft on a 47° incline, 100 ft on the level, up 50 ft at 90°, and finally 80 ft on the level. The 6 level station takes credit for the longest "down" delivery to date, a total of 1670 ft from the placer into the forms for a new slusher station on 14 level.

Lignite Output Drops

North Dakota lignite production in 1953 fell 249,124 tons from the 1952 production, according to the state mine inspector's office in Bismarck. Total production for the year was 2,911,552 tons.

New Furnace in Idaho

Monsanto Chemical Co. announced plans recently to operate a second furnace for producing elemental phosphorus at its Soda Springs, Idaho, plant. The new furnace brings Monsanto's furnaces to eight, with six operating at its Tennessee plant. The new addition will cost an estimated \$2,000,000.



"They mine a considerable amount of gold here!!"

WANTED

Sales representatives in mining field to handle powdered cleaner for the thousands of shower stall floors and walls in wash and change houses. Cleans quickly and easily where all other cleaners have failed. Removes iron rust, lime deposit, soap oil, body grease and algae formation. No scrubbing necessary. Leaves an almost slip-proof surface. Minimizes conditions that breed and distribute infectious germs. Not an ordinary all-purpose cleaner. Used in industry for 37 years. Tremendous potential. Sold on guaranteed-satisfaction basis. Commissions up to 38% on original order and all reorders paid on 10th and 25th each month. We can drop-ship direct to customer, eliminating warehousing. Literature and samples furnished. Write for further details. Berman Chemical Co., 712 Superior St., Toledo 4, Ohio.

Japan Buys Oregon Ore

North American Mineral & Metal Corp. with Tokyo Merchandise Co., Ltd., and Nippon Mining Co. have entered into a contract with Waite Minerals, Inc., Grants Pass, Ore., to reopen the Queen of Bronze copper mine in Takilma, Ore. Under a long-term contract with Nippon Mining Co., Japan's largest copper refiners, it is stated that the Queen of Bronze will ship approximately 30,000 tons of copper concentrates and ores during the next two years.

The Queen of Bronze was mined extensively during early 1900. In 1910, a serious explosion forced the mine to shut down. Aside from intermittent attempts, the mine has remained closed ever since.

It is reported that the first operation will be to leach copper from dump ore, stockpiled from previous operations. At the same time the mine will be reopened and stopes developed.

Morning Mine Closed

American Smelting and Refining Co. has closed the famous old Morning mine at Mullan, Idaho.

In steady production since 1889, the Morning mine had gained world-wide renown as the world's deepest lead mine. The lowest level in the mine, the 5200 level, is 1060 ft below sea level. Peak production was reached in 1916, when 476,360 tons of ore were mined. Peak employment at the mine was in 1925, when there were 700 men on the payroll. Recorded production has totaled 14,878,060 tons of ore.

Some of the employees of the surface plant will be retained. The mill will continue to operate, treating ore from the company's Frisco mine in Burke canyon. The machine shop and electric shop will also be maintained as service units for other Asarco properties in the district.

Win Safety Awards

J. H. East, Jr., regional director of the U. S. Bureau of Mines, named winners of safety achievement awards as including Crested Butte (Colo.) coal mine, recently closed by the Colorado Fuel and Iron Co., and three limestone quarries, operated by Ideal Cement Co., at Portland, Colo.; the Boettcher at La Porte, Colo., and the Devil Slide quarry in Utah.

CF&I Start Opening Iron Mountain Pit

The Colorado Fuel and Iron Corp. is opening up a new open cut iron mine at Iron Mountain, south of Cedar City, Utah. The mine is being developed for C. F. & I. by the Utah Construction Co. in the first major development of its kind in the area since World War II. C. F. & I. is one of the major consumers of Utah iron ore. The new mine is on a section of the vast Comstock ore body in virgin territory to the east of all Iron Mountain workings.

The Comstock project has involved construction of approximately 2½ miles of railroad tracks, extension of several miles of electric transmission lines, close to 10 miles of haulage roads, and a new county service road connecting the area with Utah Highway 56 on the south of the project. Diamond drilling has been going on in the Comstock area since 1945 and the existence of a "sizeable tonnage" of ore has been established.

A unique feature of the development will be use of a concrete "ore bedding" area where ore will be stored and mixed to uniform percentage before loading for shipment. This will enable the company to utilize some low-grade ores not now feasible.

Plan to Strip Mine U-Ore

Clyde Boyle, manager, Sodak Mining Co., Edgemont, S. D., has said that crews will soon be put to work on strip-mining uranium seven miles west of Belle Fourche, S. D. Activity is centered in Dakota and Lakota sandstones on the Alex King ranch and Enrico Bonato properties. Boyle's firm is investigating a strip 1½ miles long here and is also studying findings north and west of the Devils Tower in Wyoming.

Erect Mexican Sulphur Plant

Texas International Sulphur Co. will erect a plant for extraction of crude sulphur, using the autoclave process, near San Felipe, Baja California, Mexico, to process sulphur from its Navarro concessions and newly acquired mining rights on adjoining concessions, President Victor Dykes has announced.

Design of the plant is under the di-

FOR SALE

Two All steel 5' x 8' x 65' high shaft head frames with 60" Bicycle sheaves, bearings, crossheads, shaft buckets, and complete 24" gauge tunnel driving and lining equipment.

G. L. TARTLTON CONTRACTING CO.
West Park at Manchester Avenue
St. Louis 10, Missouri

rection of J. Harry Pollard of Houston, consulting engineer for the company, who will also supervise the plant's construction and operation.

Sulphur deposits have been known to exist in the San Felipe area, 125 miles south of the border, for almost 40 years, but heretofore no practical processing and marketing facilities have been established. New transportation facilities, together with the new processing plant, have now made the deposits of commercial value.

Texas International Sulphur Co. was organized in February by Tom Kramer and M. A. S. Makris of Houston and Mexican associates. Dykes, formerly vice-president of Texas Fund, Inc., became president in June.

Lease Quartz Hill Dumps

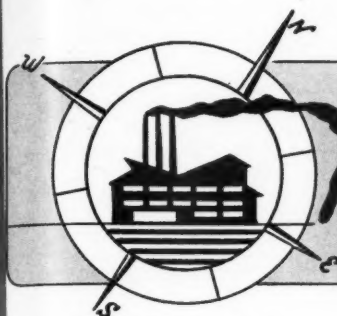
Chandler Weaver of Denver, Colo., reports that his firm has leased several of its old dumps on Quartz Hill, Gilpin County, Colo., for recovery of a good grade of pitchblende discarded years ago.

Gold Dredging Planned in Wyoming

Gold dredging operations are expected to get under way about 10 miles west of South Pass City in Fremont County, Wyo., within a year. The plans were disclosed recently when the Wyoming state land board approved a lease at the site to W. A. Jarvis and David F. Haddenham of Riverton, Wyo. Some titanium and mica also are expected to be dredged in the same operation.

Castle Dome Closes

A recent report to the stockholders of Miami Copper Co. states that the Castle Dome ore reserves of that company are practically exhausted and the property was to be shut down early in December, 1953. The mill and other equipment on the Castle Dome property, four miles west of Miami, Ariz., is to be moved to the Copper Cities property, also near Miami, where foundations are nearly completed and a large part of the preliminary stripping of the ore body has been accomplished. When the Copper Cities mine is in full production, in about one year, it is expected to replace the former annual output of Castle Dome.

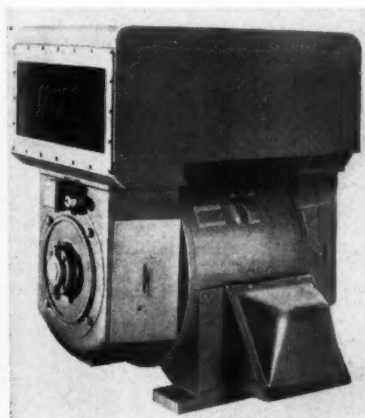


Manufacturers Forum

New G. E. Motor

A new, totally enclosed, unit-cooled, d-c motor for use in severe atmospheres has been announced by the General Electric Co.'s Direct Current Motor and Generator Department.

The new motor, smallest standard model of its type, was developed for



application in cement, chemical, and materials-handling operations. Available in ratings from 15 to 200 hp, it features 50 percent greater heat transfer in a 37 percent smaller unit than previous designs.

The new motors are available in the same speed and horsepower ratings as standard, constant or adjustable-speed, general purpose motors.

Improve Silencers

Two new series of silencers for quieting the noise produced by air compressors, blowers, vacuum pumps and other machines expelling high velocity air to atmosphere have been developed by Burgess-Manning Engineers.

To be known as the Series "CA" and "LCA," they are designed for operation under moisture-free air conditions and for temperatures up to 200° F.

Both series are absorption type silencers employing straight-through acoustically transparent perforated tubes surrounded by a deep layer of special, highly efficient, sound absorb-

ing material, and therefore, feature minimum restriction to air flow. Special sound absorbing material can be used for operation at considerably higher temperatures than the standard of 200° F.

Literature is now available on both the Series "CA" and "LCA" and may be had by writing directly to H. A. Dietrich, Burgess-Manning Co., Libertyville, Ill.

Extend Belt Life

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J., has developed a new conveyor belt cover which, the company says, promises resistance to abrasion and tearing never before attained, especially under heavily abrasive conditions, such as with ore, rock and coal.

The "XDC" Conveyor Belt Cover is an outgrowth of findings by Raybestos-Manhattan engineers that conveyor belt cover tensile strength long has been overemphasized as the prime factor in belt specification. Actually, say R/M engineers, most final conveyor belt failures are due to cover wear through abrasion, cuts and tears, rather than to cover tensional stress.

Caterpillar Celebrates 50th Year

In 1954 Caterpillar Tractor Co., Peoria, Ill., will commemorate the 50th anniversary of the world's first practical track-type tractor.

This anniversary dates back to the successful testing of the first practical crawler on November 24, 1904, in Stockton, Calif., by the Holt Manufacturing Co., one of Caterpillar's parent companies. It was the Holt Co. which originated the trademark "Caterpillar" at about the same time it made its first crawler.

This Holt unit was the forefather to approximately 340,000 track-type tractors of all makes which are now working in many fields, exclusive of the military, in the United States.

Install Large Classifiers

The first battery of 12, of what are described as the world's largest classifiers, are being installed to treat copper ore in the plant of the White Pine Copper Co. near Bergland, Mich. Manufactured by the Western Machinery Co., the classifiers have a shaft length of 42 ft 4 1/4 in. and a diam of 84 in.

Show Coal Hauler



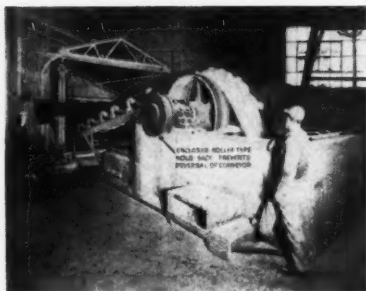
A 40-ton bottom dump coal hauling trailer, designated the Athey PH20 Coal Hauler, was announced by B. F. Lease, President of Athey Products Corp. of Chicago, Ill. This new trailer, which was engineered to match the power and speed of the Caterpillar DW20 rubber-tired tractor, has already been worked in several Canton and Peoria, Ill., coal mines.

These trailers, with frameless

welded construction, are designed to eliminate dead weight and absorb the twist of high speed hauling. The body is wide and short to make a good target within reach of a shovel dipper; it also has a low center of gravity which holds down loading height. Literature is available by writing Athey Products Corp., 5631 West 65th Street, Chicago 38, Ill.

Prevent Conveyor Reversal

The S-A Enclosed Roller Type Hold-Back is designed to prevent reversal of bucket elevators and inclined conveyors due to power failure under



load. It consists of an inner member with wedge pockets for six hardened rollers which rotates with the shaft. When the shaft attempts to reverse, the rollers wedge against an outer cylinder. The hold-back releases instantly when forward motion of the shaft is resumed. Maximum torque resistance ranges up to 350,000 in. lb for units with a maximum bore of seven in. For full information write Standard Products Division, Stephens-Adamson Mfg. Co., Aurora, Ill.

Uranium Search Aid

The Radiac Co., Inc., 489 Fifth Ave., New York 17, announces the new Model 963 Scintillometer, developed particularly for use in geological survey work such as uranium prospecting and prospecting for non-radioactive minerals associated with uranium. It is used for making production checks in radioactive ore processing



and for field and laboratory radioactive ore assaying.

Developed after four years of manufacture and research in the field of nucleonics, the new model Scintillometer incorporates numerous innovations and improvements. It can be used for prospecting on foot, from a moving vehicle and from low flying aircraft.

Small Ball Mills

Denver Equipment Co. has announced production of a new 30-in. Economy Ball Mill.

The standard mill has an alloy iron shell, hard iron liners, cast tooth gear, drum or reversible scoop feeder with Decolloy (a hard nickel-iron alloy) wearing lip, and steel cast tooth pinion gear. Shell and head liners of any material such as manganese steel or Decolloy are available.

For additional data write Denver Equipment Co., 1400 Seventeenth St., Denver 17, Colo.

Giving Coal the Shakes

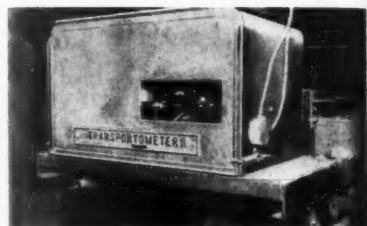
Vibration can sometimes be put to work. A novel kind of coal-mining machine, Westinghouse powered, is based on the principle of loosening coal at the vein face by subjecting it to hammers vibrating at just the right frequency. This turns out to be 30 cycles per second for many bituminous coal seams.

In this system, termed the Konnerth coal-mining system after the man in U. S. Steel who developed it, two hammers are held up against the face. Each is connected to one phase of a two-phase, 30-cycle, 30-kw generator. The generator and its control

are mounted on a truck for mobility and are built explosion-proof. The hammers, operating at the critical coal-seam frequency, tumble the coal down in large masses.

Easier Weighing

Sintering Machinery Corp., Transportometer Division, 320 Sinter Avenue, Netcong, N. J., has designed a



new offset Transportometer weighing scale for use on new or existing belt conveyor installations where overhead clearance is limited. It is designed with weight integrator scale levers and suspension framework all located under the conveyor. The weight integrator, mounted in a dust-tight cabinet, can be located on either side of the conveyor.

Storage Battery Lowers Power Costs for Lift Bridge



In addition to its fame as a landmark, the aerial lift bridge at Duluth, Minn., is notable because it is raised by power derived from storage batteries. Up until 1930, the bridge carried automobiles and passengers across the canal connecting Duluth Harbor with Lake Superior on a special gondola suspended from the overhead span. Now a continuous span permits free flow of traffic. When an ore-boat approaches, the entire span is raised.

The huge battery, installed by Gould-National Batteries, consists of 153 Plante cells (rated at 800 ampere-hours for eight hours) and raises the lift span 120 ft above water level in 55 seconds. The center span is raised about 30 times per day or 3000 lifts

per year during the open-water season lasting from April to November.

The batteries are charged by motor-generators on current purchased from the Minnesota Power & Light Co. Inasmuch as the peak-demand for electrical energy to raise the span is accumulated by the battery and the m-g set operates at a constant rate, the peak-demand charge is low. The cost of electrical energy is less than if the bridge-raising motors took power directly from the utility.

Dependability is another factor in using the large battery. The power is always available and cannot be interrupted by storms. A stand-by gasoline engine is available for charging the battery in event of a failure of the power lines but has only been used three times since 1930.

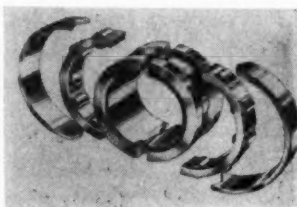
Dustproof Motor

Crocker-Wheeler Division of Elliott Co. has announced a new taconite-dustproof motor. It is of particular use in ore refining plants using the taconite beneficiation process where crushing, mixing, and drying operations produce an atmosphere burdened with fine magnetic dust. This dust is extremely injurious to windings, bearings, and other electric motor parts unless these parts are given special protection.

According to the manufacturer, the motor has passed exhaustive tests, including running for many hours in a sealed enclosure in which a heavy concentration of taconite dust was constantly circulated. Features which make the motor dustproof are nonferrous slingers and bushings, a heavy fibrous grease seal, prelubricated and sealed ball bearings, and a long, close-tolerance fit between bearing brackets and frame. Leads are sealed in with an air-hardening plastic, and the motor is selfcleaning with its fan driven cooling air directed along the heat radiating fins.

Solve Bearing Problems

Cooper Split Roller Bearings, regular anti-friction roller bearings with the added feature of being split right down to the shaft, are being sold by the Cooper Split Roller Bearings



Corp., 700 Cedar Blvd., Pittsburgh 28, Pa. The split feature of the bearings enables the user to apply an anti-friction bearing where it would be impractical or impossible to mount solid, ball or roller bearings. A wide range of dimensions and load capacities are available to suit the majority of applications.

Announcements

L. H. McReynolds, who has been with The Jeffrey Manufacturing Co. for 33 years, has succeeded W. B. Montague as manager of public relations. Montague resigned recently to accept a position in Cleveland, Ohio. A. D. Mahoney continues as sales promotion manager.

The Euclid Road Machinery Co., subsidiary of General Motors Corp., announces that V. L. Snow has been promoted to the position of Director of Sales.

J. E. Ehlert has been named manager, Domestic Sales to fill the vacancy left by Snow's promotion.

Robert J. Lenz is now manager of Euclid's Customer Service Department.

The Allis-Chalmers Manufacturing Co. officially assumed operation of The Buda Co., November 10. The company is now operated as The Buda Co., a division of Allis-Chalmers.

E. W. Spannake has been named Director of Engineering and Research for the LeTourneau-Westinghouse Co.

William H. Newton became general sales manager of the WEMCO division of Western Machinery Co. of San Francisco on December 1. Newton had been associated with the Jeffrey Manufacturing Co.

At the same time it was announced that Richard T. Lassiter had been appointed manager of the New York office of the Western-Knapp Engineering division of Western Machinery Co.

Prior to his transfer, Lassiter was chief engineer for W. K. E. on the White Pine Copper Co. project near Berglund, Mich.

Appointment of Charles W. Punton as director of engineering of Mine Safety Appliances Co., Pittsburgh, Pa., has just been announced by George H. Deike, Jr., vice-president.

C. J. Moore has been appointed sales manager of the newly formed Industrial Products Division of The Electric Storage Battery Co. Since 1949 Moore had been manager of railway and motive power sales for Exide.

The Ohio Brass Co., Mansfield, Ohio, announces the appointment of W. J. Lewis, formerly assistant chief engineer, to the position of chief engineer of the Mansfield plant. Lewis joined the company in 1941.

The Board of Directors of Hewitt-Robins Incorporated has elected Ellis B. Gardner and Robert A. Nilsen vice-presidents of the company.

George W. Thompson, manager of Atlas Powder Co.'s explosives sales district in Seattle, Wash., since 1948, has been recalled to Wilmington to become assistant to W. E. Collins, director of explosives sales.

The appointment of Spencer Bowman, in charge of Mining Research Development of the Cleveland Rock Drill Division, Le Roi Co., has been announced by Russell R. Morgan, vice-president.

Link-Belt Co. has announced the appointment of Harvey V. Eastling as general manager of the company's Pacific Division, with headquarters in San Francisco. He succeeds Ralph M. Hoffman, who is retiring after 40 years of service.

CATALOGS AND BULLETINS

ATLAS EXPLOSIVES PRODUCTS. *Atlas Powder Co., Wilmington 99, Del.* This catalog offers specific aid in the selection of industrial explosives for underground and strip mining, quarrying and construction, and seismic prospecting. One section describes and tabulates the properties of the various types of explosives, blasting caps, fuse, blasting equipment and accessories. The booklet is available without cost from the Explosives Dept. of Atlas Powder Co.

CYCLONE THICKENERS. *Heyl & Patterson, Inc., 55 Water St., Pittsburgh 22.* This bulletin describes Heyl & Patterson's new Jet-Injection Cyclone Thickener and includes results of recent tests.

DIGGING FOR YOUR FUTURE. *Bucyrus-Erie Co., South Milwaukee, Wis.* This is a 16-mm sound-color motion picture describing the application and manufacture of Bucyrus-Erie products. Running time is approximately 30 minutes. A circulating print of the movie will be loaned upon receipt of request on company letterhead. Address Bucyrus-Erie's Publicity Dept., giving dates wanted.

DOUBLE TUBE CORE BARREL. *Sprague and Henwood, Inc., Scranton, Pa.* Bulletin No. 330 contains more information regarding Sprague and Henwood's Series "M" Core Barrel than has heretofore been available in print. The company will welcome requests for the bulletin.

ELEVATOR BUCKETS. *Link-Belt Co., 307 N. Michigan Ave., Chicago 1.* Describes Link-Belt's complete line of cast malleable and Promal elevator buckets for material handling. Fifty-five standard sizes are listed. Tables give dimensions, weights and capacities. Detailed information is provided for bucket mounting. Ask for Book 2465.

HARDFACING INFORMATION. *American Manganese Steel Div., 389 E. 14th St., Chicago Heights, Ill.* Amseco is offering hardfacing welding procedure sheets to the coal industry, detailing the application, correct rod and amount needed, and the procedure for hardfacing. Sheets for coal crusher hammers, coal crusher teeth, coal gathering heads, coal pulverizer hammers, conveyor screws, diesel engine valves, tractor drive sprockets and tractor rails, are available free of charge.

MARION 111-M ELECTRIC SHOVEL. *Marion Power Shovel Co., Marion, Ohio.* Bulletin No. 408 describes the Marion 111-M Ward-Leonard Electric shovel, which carries a standard 4-yd dipper or bucket and is featured as shovel, dragline, clamshell, crane and coal loader. It contains illustrations of the unit in many material handling applications.

MINE LOCOMOTIVES. *The Jeffrey Manufacturing Co., Columbus 16, Ohio.* Catalog 836 describes trolley locomotives, cable reel locomotives and storage battery locomotives manufactured by Jeffrey. Includes a description of component parts and instructions for determining size and number of locomotives required.

TIME SWITCH. *General Electric Co., Schenectady 5, N. Y.* Describes the complete line of G-E time switches, process timers and time meters. Includes a section on selection and application information as well as descriptions of the various types and models available. Ask for Catalog GEA-5965.

Index to Advertisers

	Page		Page
Allis-Chalmers Mfg. Co.....	14-15	Holmes & Brothers, Inc., Robert.....	8
Tractor Division.....		Ingersoll-Rand Co.....	7
Anaconda Wire & Cable Co.....	17	Jeffrey Mfg. Co.....	2-3
Barber-Greene Co.	38	Joy Mfg. Co.....	36-37
Berman Chemical Co.....	68	Link-Belt Co.....	Second Cover
Blount Co., J. G.....	16	Loftus Corp., Peter F.....	59
Bixby-Zimmer Engineering Co.....	39	Midwest Steel Corp.....	61
Bowdill Co.	13, 60, 61	Mine Safety Appliances Co.....	Back Cover
Bucyrus-Erie Co.....	9	Mott Core Drilling Co.....	72
Buda Co.....	6	Ohio Brass Co.....	Third Cover
Cardox Corp.....	12-13	Pattin Mfg. Co.....	66
Centrifugal & Mechanical Industries, Inc.....	63	Pennsylvania Drilling Co.....	72
Copco Pacific, Ltd.....	38	Read, Davis	59
Crucible Steel Co. of America.....	1	Standard Oil Co. (Indiana).....	41
Deister Concentrator Co., The.....	62	Tarleton Contracting Co., G. L.....	68
du Pont de Nemours & Co., Inc., E. I.....	47	Timken Roller Bearing Co.....	40
Electric Storage Battery Co.....	4	United States Rubber Co.....	34
Fletcher & Co., J. H.....	64	Universal Vibrating Screen Co.....	72
General Electric Co.....	10-11	Western Machinery Co.....	51
Hoffman Brothers Drilling Co.....	72	Woomer & Associates, J. W.....	59



CORE DRILLING
ANYWHERE
We look into the earth
PENNSYLVANIA
DRILLING COMPANY
PITTSBURGH 20, PA.

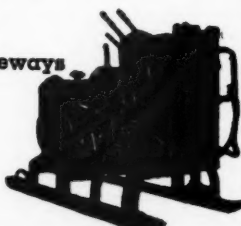
Established 1902
HOFFMAN BROS. DRILLING CO.
CONTRACTORS
DIAMOND CORE DRILLING
PUNXSUTAWNEY, PA.
Our specialty—Testing bituminous coal land.
Satisfactory cores guaranteed.

CORE DRILLING
CONTRACTORS

Testing Coal Properties a Specialty
Guaranteeing Satisfactory Coal Cores

Pre-grouting mine shafts
Large diameter holes for
Drainage, Air-shafts and Escapeways
Inside Mine Drilling

MOTT
CORE DRILLING CO.
Huntington, W. Va.



THE LATEST IN
SCREENING
EFFICIENCY!

Universal Screens &
Unilec Heating
Equipment

No blinding—Easy to
install—Economical

Write today for bulletins
Nos. 125 and 140

Universal Vibrating
Screen Company
Racine, Wis.



Use O-B Findings for SAFE, SECURE

DEAD ENDS AND STRAIN POINTS

Handle any strain-holding or dead-ending job readily with O-B Trolley and Feeder Materials! Pick insulators for proper electrical and mechanical strength, for size, for attachment method, or for suitable insulating material - wood, Dirigo, porcelain, or mica composition. Clamps and grips for all sizes of wire and cable team up with O-B insulators to hold strain or to dead-end conductors neatly and securely.

Wire Grips take sizes from 1/0 Round to No. 9 Section; Cable Clamps cover the range from 1/0 to 1,500,000 CM. Insulators range in electrical strength from 7 to 35 kilovolts; in mechanical strength, from 3000 pounds to 20,000 pounds. See your No. 27 catalog for complete information on dead-ending and strain-holding materials. It shows a complete line.



O-B Insulated Turnbuckle and O-B Dead-End Cam Grip hold end of Trolley Wire.

O-B Mechanical Feeder Wire Strain Clamps, O-B Wood Strain Insulators, and O-B Turnbuckles hold feeder cables at strain point.

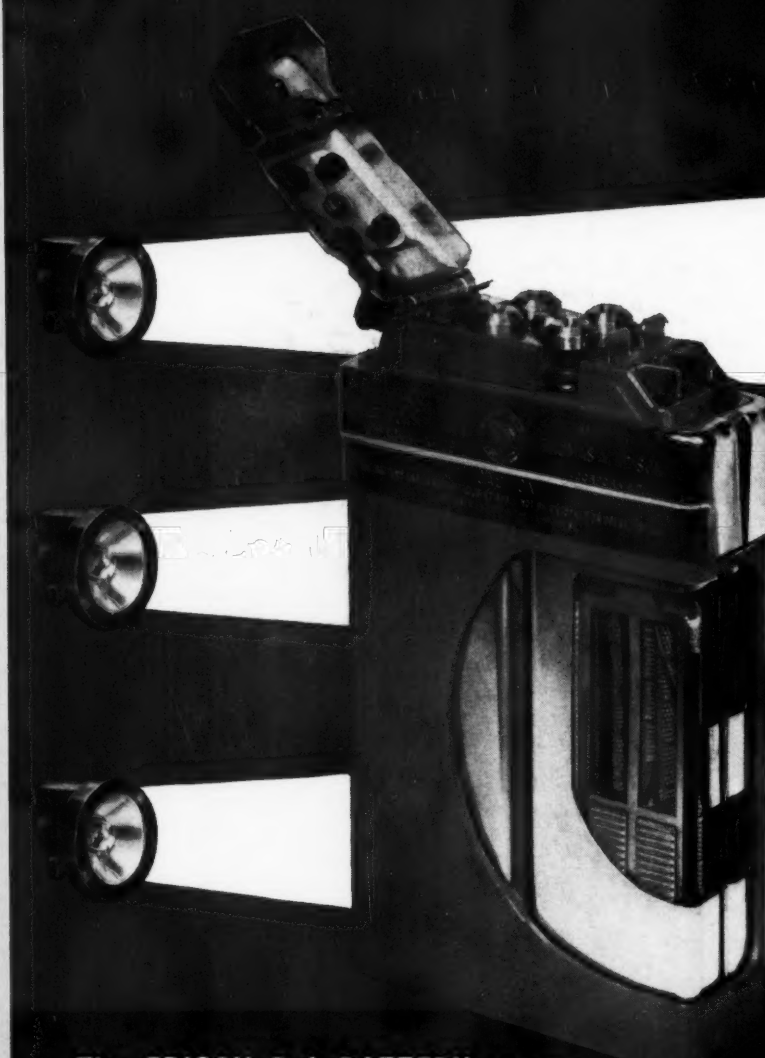


Ohio Brass

MANFIELD

OHIO U.S.A.

© 1941 OHIO BRASS CO. MANFIELD, OHIO U.S.A.



**Does not deteriorate
when not in use ...**

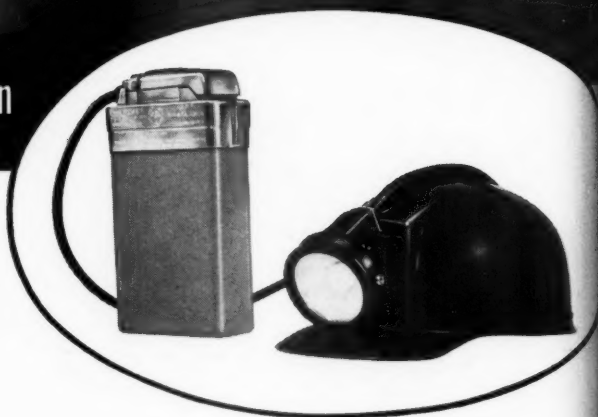
**Does not destroy
itself to function ...**

**Exclusive Construction
4 Nickel-Iron-Alkaline
cells arranged as twin-
units - increased voltage,
wattage, bulb efficiency.**

**The EDISON R-4 BATTERY means
Brilliant, Dependable, Unfailing Illumination**

Here's the store-house for the dependable power output that provides a brilliant, unfailing beam from the headpiece of the Edison R-4 Cap Lamp. This ruggedly constructed 4-cell Edison Battery was designed and built for useful service life that is measured in years. Its unduplicated strength and endurance maintain full-powered illumination shift-after-shift, for years.

We will welcome the opportunity to arrange a practical demonstration at your convenience. Write, wire or phone.



When you have a safety problem,
M-S-A is at your service. Our job is to help you.

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STS., PITTSBURGH 8, PA.

At your Service: 67 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA LIMITED

Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N. S.
Cable Address: "Minsaf" Pittsburgh

